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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society

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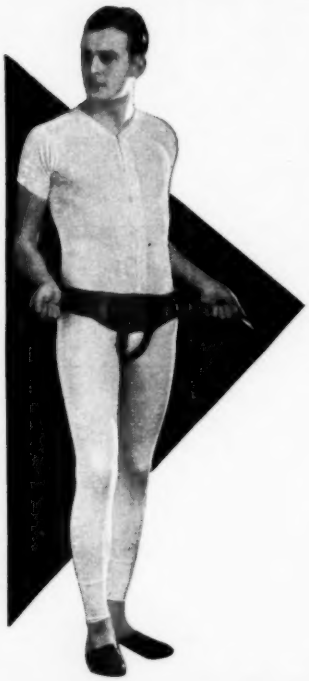

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine and Minneapolis Surgical Society.

VOL. XV JULY, 1932 No. 7

MEDICINE AND PUBLIC WELFARE*

MELVIN S. HENDERSON, M.D.
Rochester, Minnesota

MEDICINE has advanced along a changing front. Medieval medicine's outstanding contribution was the hospital. The Renaissance contributed anatomy, the science of which gave birth to the handicraft of surgery. The latter part of the sixteenth century and the early part of the seventeenth, the age of Shakespeare and of Milton, an era of an outstanding individual accomplishment, gave to medicine such men and achievements as Harvey and his "De Motu Cordis," Malpighi and his microscope, and Sydenham, who with disdain ignored his contemporaries and emphasized the value of individual clinical observations. Men of this type, by their efforts and accomplishments, raised the social status of the men of medicine. The eighteenth century saw the real beginning of modern surgery, and John Hunter plucked it from its empirical base and placed it on the firm pedestal of physiology and pathology. Jenner, by his work on smallpox, placed preventive medicine on a scientific basis, and Frank really founded public hygiene. The nineteenth century, particularly the second half, saw modern scientific medicine well launched on its meteor-like advance. Laennec, Graves, Stokes, Bright, Addison, Hodgkins are names familiar to all, and the work of Pasteur and Lister resulted in scientific surgery. The twentieth century is here, the medical profession is part and parcel of it, and is drifting with it. There is no doubt that thus far, now well into the first half of the century, the trend of medical activities is social. Our chief problem today is to see that all the vast harvest of medicine's accomplishments is made use of and that the mass of people will have the benefit of the knowledge so painstakingly gathered. Individualism in medicine, so far as it is good, should be retained, but the old, virile, independent, aggressive type, and the guild-like attitude of the profession as a whole, must adjust itself to the modern trends of society. We are in the midst of a period of social unrest and dissatisfaction with things as they have been and are, and each country and commonwealth must face its own problems. Numerous and widespread economic factors are so affecting the lives of all that contemplation of them is bewildering and straight thinking very difficult.

SOCIAL ASPECTS OF MODERN MEDICINE

Medicine's sphere in the maintenance of the social status of a people has to do particularly with their state of well-being and health, collectively and individually. As the causes of disease have been determined, preventive medicine has increased in importance. Social workers a generation ago were concerned chiefly with living conditions consequent to poverty, caused by unfair conditions of employment. Although poverty is still present in a considerable degree, social conscience has been awakened and the terrible conditions do not exist en masse as they formerly did. Social workers are more and more turning their attention to the relationship of poverty and disease. Consequent to the ever increasing work of preventive medicine, has come a change in the character of medical practice. Typhoid fever is today more a problem for the sanitary engineer than for the physician, diphtheria has lost its terror, yellow fever and malaria

*Presidential address before the Minnesota State Medical Association, St. Paul, Minnesota, May 23 to 25, 1932. From the Section on Orthopedic Surgery, The Mayo Clinic, Rochester, Minnesota.

are under control, and epidemics of all kinds are fewer in number. Many of the ills that a generation or more ago kept the practitioner busy are seen no more. We must realize these facts and be prepared for even further changes. It might be called the irony of fate that most of the changes are due to our own efforts for we have individually and collectively worked to make our service less in demand. As one prominent educator stated: "It is an example of a profession literally committing suicide." This is as it should be, and is in accord with our cherished traditions. All this has served to change the character of the relationship of the physician to the families he serves. The old type of house-to-house visiting practice is waning, and exists only in isolated spots to any degree. Much that was fine has gone with it and the physician is not, as formerly he was, the family counsellor.

ECONOMIC ASPECTS OF MODERN MEDICINE

Medical economics is becoming a much used and a loosely used term. It has to do with the laws or methods affecting the production, distribution, and consumption or use of medical services. Important economic changes it seems are in the making as evidenced by the fact that in June, 1931, of a total of 33,302 patients in the Veterans' Bureau Hospitals, 53 per cent of the men were under treatment for disabilities not related to service in the army. In England the seriousness of such a situation has been seen and the same type of case has been reduced 40 per cent. Being in this transition period it is difficult for us to see just whither we are drifting and to be certain which changes will be temporary and which will be permanent. What the basic causes are we find equal difficulty in determining. For centuries the lives of men as individuals and the forms of their governments and various methods of organization for protection and advancement were comparatively simple, but within the last century in particular advances have been beyond the wildest dreams of man. Life, and with it our governments, has become complex, and the socialistic and paternal tendencies of the latter have become increasingly difficult to keep within reasonable bounds. So many material things have been developed, greatly increasing the comfort of all men, that there seems no end to what each may possess. With all these have come burdens of maintenance, with its great costs, financial and otherwise. A distinguished philosopher, aged and in the sunset of life, recently made the remark that he doubted whether all these things had in reality added anything appreciable to the sum of human happiness. Medicine as an intricate part of our social and economic system has participated in this tremendous advance, and it must naturally share in the burdens that go with a more intricate and complex system.

In many of the lay periodicals, and in some books, the charge has been made that the cost of bringing to our patients medical care, meaning not only physicians' services but all that goes with the care of the sick, such as hospital, and nursing, is entirely too great. The tumult and the shouting that have gone on about this particular phase of social and economic affairs appear a little out of proportion, but those who render personal services of the character rendered by members of the medical profession must expect that enthusiasm and thankfulness will tend to diminish as health returns and the patient pays the bill. Many rhymes and ditties have been written which reflect this attitude and should not be lost sight of in the philosophy we must acquire. Perhaps more than any other nation we are prone to pass laws to overcome our difficulties. Very often, after the law is passed, things go on as before, and the whole matter is endured or forgotten. Because the medical profession is best qualified to pass on and to judge the merits of the many and varied measures concerning health that come before our legislative bodies for enactment, it has become increasingly necessary that we be represented at legislative assemblies all over the union. Such efforts have been public spirited and unselfish. If they were otherwise, it would be impossible to have the continued and increasing support from members of the medical associations that is being given to such work. The greater proportion of the profession, provided the facts were known, would not countenance measures that were primarily self seeking.

The rank and file of medicine is composed of persons of more than average education, and I believe of intelligence. They are a prey to the same temptations that confront their brethren in other walks of life, and the opportunity to stray is constantly present. They are, owing to the

character of their work, in a position to prey on the emotions and credulity of those who come to them. The traditions and the standard of ethics of the profession and the ideals of what is called organized medicine have helped more than anything else to keep the vast majority steadfast to these principles. I am convinced, by reason of many things, difficult to appreciate when enumerated singly but more weighty when considered in mass, that our profession does resist the temptations to evil more successfully than any other group with the exception of the ministry. No other group, individually or collectively, works to make its services less in demand. That this is true is evidenced by the fact that President Hoover in casting about for something comforting to say at this time has reminded the nation that "its health was never better." This is no visitation from on high, but is largely the result of the constant campaigning of public health education. In spite of this, our public health workers see many problems that need solution, and practitioners all over the country in increasing numbers are coöperating with them, even to their own ultimate loss. Although a few medical men are unethical in their dealings, give unnecessary treatments, charge too much, split fees and stoop to other evils, they are, as a matter of fact, very unusual physicians. Patent medicines are not fostered by the medical profession although they are considered part and parcel of medical cost. We have noted with much misgiving that more blatant advertising of claims for nostrums are appearing than for many years. Also, there is a campaign, evidently fostered by the press, to persuade the medical profession to advertise. This is undesirable, and should be guarded against, for it is being advocated in many instances, clothed in very plausible attire. Such a plan is a wolf in sheep's clothing.

The affairs of medical service are best understood by the medical profession and we should solve our own problems without outside interference. We have the advantage of seeing various types of socialized medicine in Europe. If in our trend to a more socialized type of medical service mistakes are made, it will not be because of lack of example. None is as satisfactory for all concerned as our system, even with the faults we know exist. The panel practice of England compensates the less efficient practitioner better than he was compensated before. There is still some dissatisfaction on the part of the medical profession of Great Britain with their treatment under the National Health Insurance Act. The most serious difficulty in the situation seems to be the power that the Approved Societies wield and which, it appears, is interposed between the patient and his physician. These societies wield great political power and their disappearance seems desirable for the sound working of the act. In France the profession abruptly awoke to the fact that they were confronted with a measure wholly unsatisfactory to them which had been prepared by the politicians. The profession united in a vigorous protest and refused to serve under the act. The result was that the restrictions as to treatment were modified, disciplinary measures were left in the hands of the profession, the patient was made responsible for a fair portion of the cost of treatment, thereby encouraging economy, and professional secrecy was ensured.

It is evident that the provision of medical care for the people is a proposition that sooner or later appeals to all politicians. We must therefore be prepared through our legislative committees in the various states to offer intelligent advice to the legislative assemblies when these matters are up for action.

The systems of medical care in Germany and Scandinavia were introduced long ago, in the days of the monarchistic regime, and medical education has been so conducted as to provide practitioners who would practice under such conditions of bureaucratic control. Such conditions of practice would be at this time quite unsatisfactory to the medical profession and to the public in this country. There would have to be considerable change in the general economic structure of government to make it fit. If changes are to be made it is within our power to guide legislation along these lines into paths that would tend under such a system to bring to the people the best that medical science can give. This object would be definitely defeated if the compensation that would come to practitioners under the system was inadequate to support them and their families in a manner that is their due. Such a happening would result in a lowering of educational standards that would lead men poorly qualified, not only by lack of educational background but by the lack of those inherent qualities that go to make the faithful physician, into

an occupation that they could not properly fill.

Our national, state and county organizations have functioned in the past for the best interest of the profession and the people they serve.

We must see to it that the educational facilities for the training of physicians are what they should be. This, according to our American system, rightfully belongs to the commonwealth. In Minnesota we have just reason for being proud of our state medical school. Our school ranks with the best in the country, so we may safely assume that the man who graduates in medicine from the University of Minnesota is qualified. Secondly, practice must be controlled. From time immemorial quacks and faddists have flourished in all civilized countries. They have been a constant menace to the public and an irritation to our profession. In Minnesota our basic Science Act demands that all those holding themselves out to treat the sick demonstrate a certain knowledge of the fundamentals, anatomy, physiology, pathology, hygiene, bacteriology, and chemistry. If they know these things, there is no real reason why they should not apply the treatment they consider best suited to the case. The number of poorly educated cultists practising in the state is steadily diminishing and will continue to diminish unless their schools provide better training in the basic sciences, so that those applying can show to the board that they possess the fundamental knowledge necessary to make their treatment safe. Moreover, the Medical Practice Act compels the registering each year of all physicians, regular and homeopathic, all osteopaths and chiropractors, thus making conditions difficult for impostors. Thirdly, leadership of medicine in public health measures must be attained. Our State Medical Society has been back of the legislative actions that put the aforementioned laws on our statutes and also the two-year limit on malpractice suits. Our Legislative Committee has convinced the legislators that we are working for the best interests of the people of the state. We benefit indirectly; for what is to the interest of the people makes for better conditions of practice. Minnesota was a pioneer in public health matters, and the Minnesota Department of Health is nationally known for its progressive work and has the confidence of the profession of the state. Our State Medical Society has a permanent salaried secretary who is also secretary of the Minnesota Public Health Association, thus assuring contact with that body. The aim of our organization is to keep in touch with all activities that have to do with matters pertaining to the health of the people of the state, helping where it can, discouraging misdirected or faulty efforts, and encouraging those that are good.

Medicine is both an art and a science. The art of medicine will tend to shrivel and die under the direction of a bureaucracy. In theory it is conceivable that the science of medicine could be carried out under such conditions, but difficulties arise when it is put into actual practice. The subject to be administered to is man with all his frailties, emotions, crudities, ideas, desires, and so forth. The art and science of medicine must go hand in hand.

ACUTE APPENDICITIS*

A REVIEW OF ITS SYMPTOMS, DIAGNOSIS AND TREATMENT STATISTICAL REPORT OF 346 CONSECUTIVE CASES OF ALL TYPES

O. W. Holcomb, M.D.
Saint Paul

THE symptoms of acute appendicitis are fairly constant, and the sequence in which they occur is of diagnostic importance. In a person otherwise well, acute abdominal pain, severe and colicky in character, is the earliest and most constant symptom. Frequently it is described as a stomach ache felt all over the abdomen. Occasionally it is referred to the epigastrium, rarely to the pelvis or the left side, but most often to the umbilical region. The colicky character soon subsides, and coincidently with this it becomes gradually localized in the right iliac fossa. This usually occurs within the first six to twenty-four hours. The cause of the pain is believed to be

*Retiring president's address at the annual meeting of the Ramsey County Medical Society, January 25, 1932.

due to a swelling and edema of the mucous membrane with an occlusion of the lumen, causing an active peristalsis with a further involvement of the muscular coats. If the pain ceases suddenly without abatement of the accompanying symptoms, one of several changes may have taken place:

1. Perforation of the appendix with a beginning peritonitis.
2. Dislocation of a fecal concretion or other obstruction into the cecum with the consequent emptying of its contents.
3. Gangrene may have developed, especially when the pain ceases less abruptly.
4. With a gradual subsidence of the pain and a corresponding improvement of the other symptoms, recovery will probably occur.

If perforation or gangrene has taken place, a secondary pain develops which denotes a peritoneal involvement. If there are no delimiting adhesions, a rapidly spreading peritonitis occurs, which is indicated by an aggravation of other symptoms and a board-like rigidity of the abdominal muscles, including that of the diaphragm, thus limiting the respiratory movements to the chest.

Nausea and Vomiting.—This is usually considered reflex and occurs within a few hours after the onset of pain. It is rarely absent and seldom persists beyond one or two attacks. If it recurs after the primary subsidence, it denotes a spreading of the infection and may persist until a fatal termination ensues.

Abdominal Tenderness.—Similar to the nausea and vomiting, this is reflex in character. At first superficial and diffuse, with the localization of the pain in the right lower quadrant, the sensitiveness becomes most marked in this area. With the progress of the infection and extension of the process to the serous membranes, rigidity of the overlying muscles develops. The degree of sensitiveness and rigidity varies, not only with the severity of infection and the reaction of the patient to pain, but also depending on the proximity of the appendix to the anterior abdominal wall. Further, the point of greatest tenderness indicates quite accurately the site of the appendix. Whether it be at McBurney's point or remotely situated from the usual area, the reaction is the same. If the tenderness is elicited only on deep pressure, a deeply situated or retrocecal appendix may be suspected.

Fever.—A moderate rise in temperature is a constant and early symptom in acute appendicitis. It follows directly upon the occurrence of pain and tenderness. Its presence or absence is highly significant from a diagnostic standpoint and for an accurate determination it is often advisable to take a rectal reading. It is seldom high and in most instances ranges between 99 and a fraction to 102 or slightly above. In children and in some fulminating forms, the rise is more rapid and not infrequently reaches 103 or more. The degree of elevation depends to some extent on the character of infection, the amount of absorption and the reaction of the patient, but is no index to the extent of involvement, since in many instances of very extensive involvement, the temperature may register only slightly above normal. If, after the initial rise, there is a rapid subsidence, this may denote a beginning gangrene or a perforation with a release of pressure and a temporary cessation of absorption. In either instance a secondary rise occurs as the process advances either to a localized abscess or a general peritonitis. As a rule there is an acceleration of the pulse accompanying the rise in temperature but this has no significance except in advanced cases, where, as part of the picture, it becomes weak, rapid and thready. A fatal termination then usually follows.

Leukocytosis.—As in other inflammatory conditions associated with a febrile reaction, a rise in the white cell count, chiefly affecting the polymorphonuclears, commonly occurs. In the early stage, like the temperature, it is seldom high but may persist after the initial rise of the fever has subsided. Again, like the temperature, it is a reaction to the absorption of products of infection, but because of the variability of the type of infective flora and the difference in the sensitiveness of each individual, due allowance for these factors must be given before deductions can be made. Indeed, a leukocytosis may be absent, even in perforative cases and when a general peritonitis is present.

Associated Conditions.—Constipation in association with appendicitis is common, but frequently the bowel function is normal and in occasional instances, an attack may be preceded for several days by diarrhea. Irritability of the bladder with frequent micturition may occur but this is more common in children. The decubitus is often characteristic, the patient usually lying on his back or

right side with the thighs flexed. This position relaxes the ileopsoas and thus gives a certain amount of relief.

COURSE AND TERMINATION

Not infrequently the initial attack is so mild and the symptoms so transitory that little attention is paid to the condition until sooner or later a recurrence takes place in a much more aggravated form. In the well defined case, the disease usually reaches its height in from twelve to forty-eight hours. From this on there are several possibilities:

1. *Resolution and Gradual Recovery.*—After the primary symptoms have persisted from two to three days, the temperature gradually subsides. The swelling and edema of the appendix recedes, the muscular rigidity becomes less pronounced, the appetite returns and the bowels regain their function. By the end of a week the symptoms may have all disappeared, except for a slight tenderness over the appendix, which usually persists after all other signs have disappeared.

2. *Localized Peritonitis with Abscess Formation.*—In the more severe type, the inflammatory process rapidly extends through the walls of the appendix and causes a localized peritonitis or a persistence of the obstruction to the lumen, causing an increased pressure within the appendix and a consequent necrosis of the mucous membrane with a liquefaction of its contents and a subsequent rupture. This may take place in any part of the appendix but more commonly occurs within the leaves of the attachment of the mesentery at its weakest point or not infrequently at the site of a fecalith, causing ulceration with a surrounding zone of gangrene. As a result of the perforation a certain amount of the appendiceal contents escapes directly into the peritoneal cavity. If delimiting adhesions take place, an abscess results. If the pus escapes between the leaves of the mesoappendix, a mesenteric abscess develops. In other instances the location of the abscess varies with the site of the appendix. Without intervention the process may subside and the abscess become absorbed or encapsulated or it may continue to enlarge and extend in the direction of least resistance. It may perforate into a coil of adherent intestine or other adjacent hollow viscus and so empty itself. It may perforate the posterior peritoneum and extend along the great vessels or even open directly into them, causing fatal hemorrhage. If extension takes place in an upward direction, a sub-diaphragmatic abscess may form; if it gravitates in a downward direction, a pelvic abscess is the result. In rare instances when the tip of the appendix stretches across the abdomen and perforation takes place at its extremity, the abscess may be situated wholly in the left lower quadrant of the abdomen. Finally perforation may take place in the free cavity, resulting in a general peritonitis.

3. *General Peritonitis.*—In the rapid fulminating types, perforation or gangrene takes place early before delimiting adhesions have formed and general peritonitis results. The character of the symptoms is more intense from the onset. The pain and tenderness are diffuse and may not become localized. The rigidity involves all of the muscles of the anterior abdominal wall. Peristaltic action of the bowels ceases and on auscultation the abdomen is quiet. Respiration is costal. The decubitus is dorsal with knees flexed. The pulse is accelerated and the temperature usually high. The above description refers to the early stage. Later the local reaction is less pronounced, the abdomen becomes distended, the constitutional symptoms more decided with high fever, chills and sweats and a rapidly fatal termination.

DIAGNOSIS

In the average case where all of the symptoms are present and in the absence of complications, the diagnosis is usually easy. Unfortunately, however, due to difference in individual reaction and frequent anatomic anomalies of the appendix, the diagnosis may in an occasional instance remain in doubt until the abdomen is opened. No single symptom or group of symptoms are in themselves diagnostic. Any one or all of the so-called cardinal signs, except pain, may be absent or altered. It is only when the clinical picture is viewed as a whole, taking cognizance of the sequence of symptoms, that a sound interpretation can be made. Murphy stressed the presence of temperature and the order in which the symptoms occur. He questioned the diagnosis in all cases in which there was an absence of temperature in the early stage or in which the order varied. Almost always the order is as follows: pain, nausea and vomiting, tender-

ness and rigidity, rise of temperature and leukocytosis.

Of the diseases which most commonly may be confounded with appendicitis are those characterized by acute abdominal pain, namely, acute biliary or renal colic, gastric or duodenal perforation, ruptured tubal pregnancy, twisted pedicle or acute salpingitis. In most instances, however, with a careful history and physical examination, and with the aid of laboratory tests of blood and urine, a decision can usually be reached.

TREATMENT

Before entering upon the discussion of the treatment, two pronouncements should be made. First, no opiates should be administered before the diagnosis has been established and the manner of treatment decided upon, since they mask the symptoms and lure the patient into a false sense of security. Second, no cathartics should be given at any time during the active stage of the disease. They increase the peristaltic action of the bowels and by so doing spread the infection mechanically.

First Stage.—In the first stage of the disease the treatment is appendectomy. The rationale of this procedure cannot be questioned. Early operation removes the lesion, prevents recurrences and lessens the hazard of complications. It is the safest form of treatment and unless there is some definite contraindication, operation should be performed as soon as the diagnosis has been made. It cannot be too strongly emphasized that the opportune time for intervention is while the disease is still confined to the appendix. This is the time of election; the safe period when the disease may be completely eradicated with practically no more risk than there is in doing an exploratory laparotomy. When the infection has once spread beyond the confines of the appendix, whether it be in the form of pylephlebitis, septico-pyemia or peritonitis, the mortality immediately mounts. It is true that in a number of instances there is a tendency to recovery, but no one has yet been able to propound a single sign or symptom in this stage whereby a favorable termination can with any degree of certainty be foretold. Besides, as pointed out by Royster, acute appendicitis is a "going concern" and the relief of the immediate symptoms in no wise signifies the obliteration of the disease. One attack usually presages another and not infrequently an early perforation or perhaps, if less virulent, a local point of infection remains, which may become more or less dormant, but nevertheless may produce far reaching and damaging results.

Postponement of active interference is justified only (1) in the presence of more serious disease elsewhere in the body; or, (2) when there are definite signs that the patient when first seen is progressing to recovery.

In neither of these groups, however, has the necessity for operation been vitiated in the least. The offending member is still present and should be removed, but at a more favorable time.

Second Stage.—During the increase in the inflammatory process which usually occurs from the second to the fifth day, one would expect to find at operation a thick swollen appendix bathed in pus, a perforation or gangrene with a spreading peritonitis. This is the period in which Maurice Richardson expressed his famous epigram "too late for early operation and too early for late operation." A violent controversy raged between surgeons about a quarter of a century ago, whether to operate or not to operate in this stage. Nor is the question much nearer solution now than then. Favorable statistics may be had on either side. But from this difference in opinion came two well defined methods for the management of these cases. They are known as Ochsner and Murphy treatments.

Ochsner devised his plan especially for those cases coming under observation almost hopelessly ill with a perforative appendicitis and diffuse peritonitis. The object is to still peristalsis in the small intestine and favor localization of the process. Briefly this plan is as follows:

1. Fowler's position.
2. Repeated gastric lavage for nausea and vomiting.
3. A large dressing to abdomen held in place by a binder (for protective purposes).
4. Nothing by mouth.
5. No cathartics. No large enemas.
6. Proctoclysis with 10 per cent glucose in saline with 1 to 2 c.c. of tincture of opium to each 500 c.c.
7. Morphine sulphate gr. ¼ with atropine sulphate gr. 1/150 as indicated for pain. This regime is continued until the patient's temperature

APPENDICITIS—346 CONSECUTIVE CASES

	Number	Per cent
I. Acute appendicitis	153	44.2
II. Subacute appendicitis	40	11.6
III. Chronic appendicitis*	151	43.6
IV. Miscellaneous:		
Tuberculosis	2	.6
Carcinoma	0	.0
Total	346	100.0

*Chronic appendicits.
A. Low grade appendicitis.
B. Recurrent appendicitis.
C. Interval appendicitis.

ACUTE APPENDICITIS

Age	Males	Female
1-10	8	3
11-20	24	23
21-30	24	25
31-40	12	8
41-50	8	7
51-60	2	3
61-70	4	1
71-80	0	1
	82	71

ACUTE APPENDICITIS—SEASON

January	11
February	21
March	16
April	6
May	12
June	9
July	10
August	9
September	14
October	17
November	17
December	11
Total	153

ACUTE APPENDICITIS

Previous attacks	73
Number	1 to many
Duration	1 month to 15 years
First attack	80
Complications:	
Pregnancy	1
Tonsillitis	1
Cathartics	2

ACUTE APPENDICITIS—153 CASES

Symptoms (subjective)	Number	Per cent
Abdominal pain	153	100.0
Nausea	68	44.4
Vomiting	77	50.3
Anorexia	18	11.8
Constipation	11	7.2
Diarrhea	7	4.6
Fever	17	11.1
Chills	3	2.0

ACUTE APPENDICITIS—153 CASES

Physical Signs and Laboratory Findings

	Number	Per cent
Tenderness (abdominal)	153	100.0
Muscle rigidity	109	70.9
Mass	7	4.0
Distension	7	4.7
Rectal (tenderness)	5	3.3
Leukocyte count	6,000–36,000	
Temperature	96.0°–104.0°	
Pulse	60–140	
Duration	6 hours to 1 month	

Note:
Temperature—
Normal (96.0 to 98.8) 53
Elevated (99.0 to 104.0) 90
Not recorded 10

has been normal for four days. Diet is limited to liquids before operation.

It should be borne in mind that this plan is not intended as a substitute for operation but merely as a preparatory treatment until such time as the symptoms may have subsided, making the operation a relatively safe procedure. It is not recommended for either the very young or the aged.

Quite contrary to Ochsner's views, Murphy found just as positive indications for operation in this as in the first stage. "But," he says, "the operation must be a limited one, that is, simple opening of the peritoneum for the relief of pus tension in the infected area, with the removal of the appendix if it be accessible and easily amputated. There should be the least possible separation of agglutinations or other trauma to the infected tissues and no excessive manipulations, sponging, flushing, adhesion separating or prolonged operation." He further advised drainage in all severely acutely infected cases even though the appendix is not perforated. In the main, his after-treatment consisted in placing the patient in Fowler's position and the administration of saline solution per rectum. In each instance an attempt is made to make the patient retain 750 c.c. of the solution every two hours. Both of these plans have their advocates. Personally, I have the feeling that, if for any reason operation is refused or, by force of other circumstances, interference is judged inadvisable, the Ochsner treatment is perhaps the most rational non-operative treatment devised. On the

ACUTE APPENDICITIS—153 CASES

Treatment

	Number	Per cent	Mortality Number	Mortality Per cent
I. Appendectomy with closure	101	66.0	1	0.7
II. Appendectomy with drainage	32	20.9	2	1.3
III. Drainage only	20	13.1	2	1.3
	153	100.0	5	3.3

Note: Mortality in Groups II and III (52 cases) was 4 (7.7 per cent). In the group of intercurrent, subacute or chronic cases (193) there was no mortality.

ACUTE APPENDICITIS—153 CASES

Complications and Sequelæ

1. Peritonitis	1
2. Secondary abscess	5
3. Obstruction	1
4. Fecal fistulæ	1
5. Pneumonia	2
6. Acute dilatation of stomach	1
7. Wound infection	4
8. Miscellaneous:	
Infected finger	1
Hemorrhage from wound	1
Empyema	1
Phlebitis	3
Psychosis	1

ACUTE APPENDICITIS—153 CASES

	Number	Per cent	Mortality Number	Mortality Per cent
A. Acute suppurative appendicitis	108	70.6	1	0.7
B. Acute suppurative appendicitis, perforation with—				
1. Local peritonitis	5	3.2		
2. Abscess	11	7.2		
3. General peritonitis	19	12.4	3	2.0
C. Gangrenous appendicitis with—				
1. Local peritonitis	3	2.0		
2. Abscess	0	0.0		
3. General peritonitis	7	4.6	1	0.6
	153	100.0	5	3.3

ACUTE APPENDICITIS—153 CASES

Deaths

	Age	Sex	Cathartics	Leukocytes	Temperature	Pulse	Time ill	Operation
1. Acute suppurative appendicitis	52	F.	0	18,700	103	100	7 days	Appendectomy and closure
2. Acute suppurative appendicitis with perforation and general peritonitis	61	M.	0	.....	97	82	18 hours	Appendectomy and drainage
3. Acute suppurative appendicitis with perforation and general peritonitis	12	M.	0	.....	0	0	3 days	Drainage only
4. Acute suppurative appendicitis with perforation and general peritonitis	20	M.	0	.....	0	0	3 days	Drainage only
5. Gangrenous appendicitis with general peritonitis	66	M.	0	21,300	101.2	106	2 days	Appendectomy and drainage

other hand, with the patient in a hospital, where a competent surgeon is available and the after-treatment can be supervised, it would seem that the patient would be safer with some form of drainage at any stage of the disease and removal of the focus when possible. By so doing we relieve the body of infectious material which it would otherwise have to absorb. But as pointed out by Murphy, the operation should be a limited one and frequently consist of nothing more than an incision and provision for adequate drainage.

Third Stage.—If the inflammatory process subsides without localization of any appreciable amount of pus formation and the symptoms improve correspondingly, interference may well be postponed until such time as the inflammatory process has more or less completely disappeared. If there is abscess formation, the patient should be carefully watched. Small collections may possibly become absorbed but an abscess of any ap-

preciable size should be incised and drained, since there is always a possibility of perforation, either into the free peritoneal cavity or some adjacent viscus. In an occasional instance, perforation may take place into an intestinal loop and a spontaneous recovery take place. But no dependence can be placed on such a fortunate termination.

Fourth Stage.—In the intercurrent or quiescent stage no emergency exists but the patient should be advised:

1. That acute attacks recur in a large percentage of cases.
2. That once an appendix has been affected, perforation may occur very early in a subsequent attack.
3. That a chronic infection may result in adhesions and flexions, causing disturbances of the digestive tract.
4. That the diseased appendix may remain as a point of focal infection.
5. That the operative risk during this stage is almost nil.

The technic which I have come to use in most all cases of appendicitis is as follows: The incision is an oblique right rectus, about two to three inches in length, the upper end being at the outer border of the muscle, then running obliquely inward and downward across the fibers. The muscle fibers are separated about 0.5 to 0.75 inch from the outer edge. The peritoneum is carefully opened between two forceps. The appendix is located either by following the ventral longitudinal band of the caput coli to its base or by finding the terminal ileum and following it to the ileocecal junction. If these methods fail, either a non-descent or a failure of rotation must be considered. When posible, the appendix with the caput coli is brought to the surface. The meso-appendix is clamped, ligated and then divided. The base of the appendix is similarly clamped and ligated. After division, the stump is cauterized with iodine and invaginated with a purse string of silk or linen. The stump of the appendix should always be ligated before invaginating, since fatal hemorrhage into the intestine may occur if this is omitted. This simple technic with closure of the abdomen without drainage, is used in the early acute or intercurrent stage.

In the second or progressive inflammatory stage, if mobilization of the caput is difficult or if great induration exists at the head of the cecum, making invagination difficult or impossible, the base of the appendix is simply ligated with silk or linen and cauterized without invagination.

DRAINAGE

In the beginning of this period of progressive inflammation we may find an unperforated appendix with a localized peritonitis and a quantity of serous or sero-fibrinous exudate. The question at once arises whether or not to drain. Closure is safe only when there is no necrosis of the tissues, no dead body cells and no bacteria in the exudate. Microscopic examination of a smear during the operation is of value only when positive, since bacteria may be present even with a negative slide. Not only should the extent of the process and character of the fluid be taken into consideration but also the general condition of the patient, since the latter furnishes an index to the toxicity of the infection present. In general it may be stated that, if, after the removal of the appendix, no questionable necrotic tissue is left behind, if the amount of fluid is small and not turbid and the peritoneum only slightly or moderately congested, the abdomen may be closed without drainage. In the rapid fulminating types, drainage should be instituted, whether the appendix is perforated or not.

The material used for drainage should be either rubber tubes of ample size and length or empty cigarette drains. Two or three medium sized cigarette drains may be used in place of a single tube. In case of a diffuse general peritonitis, drainage should be provided, both at the site of the appendix and in the pelvis, and in order to be effective the tubes must extend to the bottom of the cavities.

In the event of abscess formation, drainage should be provided at a point most easily accessible. The general peritoneum should be protected as far as possible by packs before an abscess is opened. The free pus may be aspirated or cautiously sponged out. The cavity should be explored sufficiently to locate all ramifications in order to efficiently drain all portions. In the presence of a pelvic abscess, drainage may be readily provided in the female by an incision through the posterior vaginal fornix. In the male, when the abscess is low in the pelvis and bulges into the rectum, the first thought would

be to drain by this route. But I would hesitate before attempting this method since the abscess cavity may later become impacted with feces. In a single instance, which occurred in my series, I drained a huge abscess successfully through an incision made to the right of anal sphincter and parallel to the bowel. The dissection was carried out bluntly with one finger in the rectum as a guide until the abscess wall was reached. The wall was perforated by a small stab and enlarged with forceps. A large rubber tube was inserted for drainage. Recovery was uneventful.

Drainage is usually required for seven to ten days—seldom less but sometimes more. It is unwise to disturb or attempt to shorten the tubes until the acute inflammatory symptoms have subsided. If there is much swelling and local wound reaction, a moist pack is of benefit.

POSTOPERATIVE TREATMENT

The technic of the operation is admittedly important but it is only part of a life saving measure, and unless it is followed by an equally efficient after-treatment, success is not likely to follow. The immediate indications are to lessen the absorption of toxic products and replenish lost body fluids.

The first proposition is met by placing the patient in Fowler's position and the second by the administration of large quantities of saline solution or saline solution with 5 per cent glucose added. In severe cases an adult patient should receive no less than 3,000 c.c. of the solution during the first twenty-four hours and thereafter as indicated, but the total daily intake should not fall much below this amount until the patient is well on the way to recovery. The first 1,000 c.c. may best be given by hypodermoclysis during the operation. Immediately after the patient has been put to bed, proctoclysis is started, preferably by the gravity method as advocated by Murphy. If the patient absorbs sufficient quantities of the fluid, nothing further is needed, but if the quantity is less than the required amount, it should be replaced either by hypodermoclysis or intravenously. The important point is the amount, not the method.

For the relief of pain, morphine or codein should be administered. In young children codein should always be the choice. Morphine is unsafe. It is better to promote rest and sleep than permit the patient to expend his energy in restlessly tossing from one part of the bed to another. As improvement takes place, or usually in twenty-four to forty-eight hours, sips of hot water may be given by mouth and cautiously increased. On the third or fourth day a liquid diet is gradually begun. The bowels are moved by enemas as required. Cathartics and pituitrin are contra-indicated.

The accompanying charts show an analysis of the records of 346 consecutive cases of all types of appendicitis operated upon by the writer at Bethesda Hospital during the past decade. Cases in which the appendix was removed incidental to other operations are not included.

I am very much indebted to Dr. C. E. Johnson for reviewing the histories of the cases in connection with the tabulation of this report.

MYODINE, SUBIDIN AND SANGUIODIN NOT ACCEPTABLE FOR N. N. R.

On account of the exploitation of certain "water-soluble" tinctures of iodine, claimed to be less irritant than, and therefore superior to, the official preparations Compound Solution of Iodine (Lugol's Solution) and Tincture of Iodine, Torald Sollmann, in 1919, published a report comparing the properties of the official solutions with those of the proprietary preparations. It was found that the official preparations were actually somewhat less irritant to the skin than the secret or nonsecret "miscible tinctures"; that the simple alcoholic solution of iodine was best for "disinfection" of the skin and that the delayed protein precipitation by the U. S. P. tincture would probably render it somewhat superior for the disinfection of open wounds. The Council on Pharmacy and Chemistry reports that there appears to be a recrudescence or a continued vogue of proprietary preparations advertised with claims similar to those made for the discredited "water-soluble" tinctures. The Council reports that Myodine, Subidin and Sanguiodin are stated to be products of the I-O-Dine Laboratories, Inc., Philadelphia, marketed by Eimer and Amend, New York, claimed to be "proteinized" or "vegetized" iodine solutions, prepared by combining "crystal iodine . . . with seaweeds and vegetables which have an affinity for iodine digested by a special process." The Council found Myodine, Subidin and Sanguiodin unacceptable for New and Non-official Remedies because they are unscientific modifications of an official article, marketed with unwarranted claims and indefinite and incorrect statements of composition under proprietary, uninforming names. (Jour. A. M. A., February 20, 1932, p. 639.)

PERFORATING LESIONS OF THE LARGE INTESTINE

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THE three common causes of perforation of the large intestine, exclusive of violent injury, are diverticulitis, chronic ulcerative colitis and carcinoma. It has been shown* that perforation occurs in 3.4 per cent of cases of chronic ulcerative colitis. In such cases the diagnosis of the disease has usually been established, or if the patient is seen just at the time of perforation, it can be established by careful anamnesis. Our study concerns the relative incidence, the diagnostic features, and the nature of the perforation by diverticulitis or by carcinoma.

In the fifty cases in our series the perforations were all due to diverticulitis or to carcinoma. This was confirmed either at operation or at necropsy. Symptoms suggestive of perforation were present in all cases; they differed from those common to the various forms of acute, subacute and chronic obstruction of the colon. The fifty cases were selected from 116 consecutive cases of diverticulitis of the colon and 1,502 consecutive cases of carcinoma of the colon, in which operation was performed at The Mayo Clinic. In fifty-two of the 116 cases a diagnosis was made at operation of perforation by diverticulitis, and in 141 of the 1,502 cases, by carcinoma. Clinical, preoperative and historic data were available in only thirty of the cases of diverticulitis and in nineteen of the cases of carcinoma. In the fiftieth case there was a perforating carcinoma at the splenic flexure and a perforative type of diverticulitis with formation of abscess in the descending colon; thus there were fifty-one lesions in the fifty cases.

AGE AND SEX

Twenty-five of the patients with diverticulitis were men and six were women. One of the men was in the fourth decade of life, nine each were in the fifth and sixth decades, and six were in the seventh decade. Three of the women were in the fifth decade, two were in the seventh, and one was in the eighth. The youngest man was aged thirty-eight years, and the oldest sixty-six. The youngest woman was aged forty-six years, and the oldest seventy-seven.

Seven of the patients with carcinoma were men, and twelve were women. One man was in the fifth decade, three were in the sixth, and three were in the seventh. One woman was in the fourth decade, five were in the fifth, five were in the sixth, and one was in the seventh. The patient with carcinoma and diverticulitis was a man aged sixty-nine years. The youngest man was aged forty years, and the oldest was sixty-nine. The youngest woman was aged thirty-seven years, and the oldest was sixty-six.

TYPE OF PERFORATION

In seven of the cases of diverticulitis, perforation resulted in an inflammatory mass and in eight cases abscesses formed. In three of the latter a draining fecal fistula had followed drainage of the abscess elsewhere. In the sixteen remaining cases spontaneous fistulas formed, two perforating into the small intestine and fourteen into the bladder. This suggests the fairly common origin of vesicocolonic fistula by diverticulitis.

In eight of the cases of carcinoma, including the case of diverticulitis and carcinoma, perforation with inflammatory reactions had occurred, and in four cases gross abscesses were present. In one case a lesion of the transverse portion of the colon had perforated, forming a fistula into the stomach, and in one it had perforated onto the gastric wall. In two cases there were fistulas into the bladder, and in one case a perforation onto the posterosuperior wall of the bladder would in all probability have developed into a fistula. In two cases vaginal fistulas had developed. The manner of perforation of the two lesions varied. In diverticulitis, a severe, rather

*Bargen, J. A., and Jacobs, M. J.: Perforation of the colon in chronic ulcerative colitis. Arch. Int. Med., 43:483-487 (April), 1929.

acute process tends to form an abscess with liquefaction necrosis of surrounding tissues and perforation into adjacent viscera provided the wall of the abscess has not formed quickly enough, whereas in carcinoma there is slow growing through an organ with the attendant infection which is necessarily associated when bacteria are carried with the lesion.

SITE OF PERFORATION

The site of such lesions is significant. The diverticulitis occurred in the sigmoid or lower part of the descending colon in thirty of the cases, and in one case it occurred in the cecum. Carcinoma occurred in the sigmoid in six of the twenty cases; four occurred in the cecum, four in the transverse colon, two in the rectosigmoid, and one each in the ascending colon, hepatic flexure, splenic flexure and descending colon. Thus, of the carcinomas, ten occurred in the left half, six in the right half, and four in the transverse portion of the colon.

SYMPTOMS

Pain was the most common symptom, being present in twenty-six of the thirty-one cases of diverticulitis, and ranging in degree from slight pain in eight cases, to severe pain which could be classified as acute in twenty-three cases. In thirteen of the cases of carcinoma, pain was present severe enough to be called acute, in one case the pain was less severe, and in the other six cases pain was not a prominent symptom. Factors causing the pain were mentioned by eight patients. Three attributed the pain to riding on a train, one patient to walking on crutches, one to a fall, one to cold water, one to manipulative massage and one to pitching grain.

Fever was present in twenty-one cases of diverticulitis; it was associated with chills in nine. In ten of the cases, the temperature ranged from 100° to 104° F.; in seven of these it was 102° F., or more. In twelve cases of carcinoma there was a history of fever; in five it was associated with chills. The temperature in these cases was lower; in only three was it more than 101° F.

Vomiting was present in five cases of diverticulitis and in two cases of carcinoma.

An abdominal mass was present and palpable in twelve of the cases of diverticulitis and in eight of the cases of carcinoma. In only one of these was the mass palpated by vagina.

In one case of diverticulitis, blood was present in the stools at the time of onset of pain, and in one case "inky" stools were passed.

In the whole group there were sixteen vesicosigmoid fistulas, only two of which were caused by carcinoma, the other fourteen originating in the perforating diverticulitis. The site of the lesion undoubtedly is a factor in this incidence. As has been stated, in thirty of the cases of diverticulitis, the lesion was in the sigmoid, and in only six of the cases of carcinoma was the lesion in the sigmoid. Additional symptoms in these cases were: urinary frequency, dysuria, and the passage of blood, pus, feces and gas by urethra. The duration of these symptoms ranged from two weeks to five years, but in most cases the fistula was present less than nine months.

It was estimated that the majority of these patients presented themselves at The Mayo Clinic within three months from the onset of symptoms. A careful analysis of the two groups of patients suggests a fairly distinctive picture for each group. In diverticulitis there are the symptoms of acute or subacute perforative appendicitis of the left side. In carcinoma the perforation could be considered subacute or chronic. In diverticulitis there is usually an antecedent history of exacerbation of similarly mild attacks with complete or almost complete remission of symptoms, and finally a more severe attack resulting in perforation and formation of abscess. In carcinoma there is gradual progression of a lesion infiltrating and growing through the wall of the bowel, resulting in a chronic but progressive process. In such cases the sudden dissolution of the wall of the bowel and acute abscess formation does not occur. Hence walling off of the process in most cases probably keeps pace with perforation. In carcinoma, therefore, obstructive features frequently antedate those of perforation or at least mask the latter because they are not severe or acute. On the other hand, an active inflammatory process occurring in a thin-walled pouch-like diverticulum with a bottle-neck must cause more severe "explosive" symptoms if proper protection from adjacent viscera is not at hand.

The sigmoid portion of the colon of men lies in juxtaposition to the posterior wall of the bladder and diverticulitis is most common in the sigmoid; hence it is easy to understand why a vesicosigmoid fistula should result relatively frequently. The fact that the uterus lies between

the bladder and the sigmoid makes perforation among women less likely. It seems fortunate that diverticulitis occurs in a portion of the colon where proximity of organs to omentum and mesocolon are so situated that the abscess usually becomes walled off. It seems surprising that

Fig. 1. Specimen of bladder and sigmoid with hugely thickened and inflammatory wall between them. Arrows point to the perforation.

patients tolerate the passage of blood, pus, feces and gases through the urinary bladder as well as they do.

In ten of the cases, fistula had been present more than two years, before the patient came for examination, and in one case had been present for five years before the patient arrived at the clinic. The diagnosis of perforative diverticulitis would seem then to rest on a history of recurrent left sided appendicitis with mild obstructive features, sudden severe pain and a tender, relatively immobile mass in the lower left part of the abdomen, and fever usually 102° F. or more, associated with chills. When the perforation apparently is occurring slowly, with marked obstructive features and other signs of carcinoma such as anemia and bleeding, and a relatively mild degree of fever, usually below 102° F., carcinoma with perforation should be suspected. Contrary to the usual belief, age is of little if any significance, both conditions occurring usually between the fourth and eighth decade, the greater number being in the fifth and seventh decades. Besides these important historic data the usual laboratory diagnostic aids employed in the diagnosis of any rectal or colonic lesion come into play. The sigmoidoscopic examination may establish the diagnosis. Usually, however, the condition is too acute to warrant intracolonic manipulation and so roentgenologic observation must often be delayed until acute symptoms have subsided.

An interesting factor in the types of inflammatory lesions caused by carcinoma and diverticulitis is that in carcinoma the inflammation is carried through the wall of the bowel with the growth, whereas in diverticulitis perforation of a diverticulum in the serous surface of the bowel occurs. This may be the chief cause of early vesical perforation. An illustrative case follows:

A man, aged sixty-nine years, came to The Mayo Clinic, February 15, 1929, because of recurrent attacks of pain to the left and below the navel which had begun three months before admission. Occasional mild attacks of intestinal discomfort had been present for thirty years. The pain was more severe on defecation; there was some looseness of the stools, nausea and vomiting and a little fever. The first attack lasted one week. After several weeks of relief a second similar attack occurred and during the three months there had been a series of attacks, with 25 pounds loss of weight. In the month prior to admission urination was painful, with passage of gas through the bladder. Fecal matter had not been seen in the urine, and it appeared fairly clear.

The patient's temperature was 103.2° F., he appeared ill, and the tongue was parched and dry. There was a mass in the left lower quadrant with some abdominal rigidity. Repeated examinations of the urine revealed pyuria graded 4 and albumin graded 2 and 3. Leukocytes numbered 10,800, and the concentration of urea was 29 mg. in each 100 c.c. of blood. A diagnosis of diverticulitis with abscess and fistula into the bladder was made. The condition was too acute to attempt a roentgenogram with barium. Daily fever and marked tenderness continued until obstructive symptoms increased and cecostomy was performed. The patient died the day after the operation, due to intestinal obstruction and peritonitis (Fig. 1).

SUMMARY AND CONCLUSIONS

Fifty patients with perforating lesions of the large intestine were observed. Multiple attacks

of pain in the left lower quadrant of the abdomen, and finally severe acute pain favors the diagnosis of diverticulitis. Symptoms of perforation and fever tending toward higher levels pointed to diverticulitis. A vesicocolonic fistula suggested the probability of diverticulitis. When there is gradually increasing chronic obstruction with superimposed symptoms of perforation, with fever below, rather than above 102° F., malignant disease should be suspected. Diverticulitis is more prevalent among men than among women.

CLINICAL SIGNIFICANCE OF MELENA*

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BECAUSE of the multiplicity of possibilities in considering the causes of gastro-intestinal hemorrhage, the search to explain the source of the melena will never cease to have its uncertainties. For a period of several years and until recently, melena occurring when the history is either very indefinite, or there are no data, and when it has not been possible to demonstrate gastro-intestinal lesions by the roentgen rays, has been regarded as being due to obscure extraneous causes, such as disease of the liver, of the spleen, or one of the various blood dyscrasias that had not been identified clinically. Formerly, when gastro-enterostomy was done for peptic ulcer with clinical and roentgenologic confirmation, the external signs of ulcer were not always apparent. However, since surgical procedures have been resorted to, such as partial gastrectomy, pyloroplasty, and the opening of the stomach and duodenum in exploratory operations for bleeding lesions, it has been found that intrinsic lesions of the duodenum, stomach, or intestinal tract usually are the cause of gastro-intestinal hemorrhage. As a result of the study of large numbers of patients with duodenal and gastric ulcers, it has been estimated that there is gross bleeding in approximately 20 to 25 per cent of the cases at some time during their course. The bleeding in peptic ulcer undoubtedly is frequently occult, and tests for occult blood in the stools will occasionally be positive. However, in practically all cases, the bleeding of peptic ulcer occurs in the form of fairly large gastro-intestinal hemorrhages, evidenced by secondary anemia and several days of tarry stools, and it is this occurrence that brings the patient to the attention of his physician.

The history given by a patient with peptic ulcer may be so characteristic that in certain instances, especially in cases of continued melena, it is unnecessary to subject him to further investigations before surgical procedure is advised. In other cases there are no symptoms except those associated with the hemorrhage, and in still others the history is somewhat suggestive of peptic ulcer but associated with other features so indefinite as to make a clinical diagnosis uncertain. The group in which the history is uncertain and the group of silent bleeding peptic ulcers comprise an appreciable percentage of bleeding peptic ulcer. There are certain duodenal ulcers and duodenitis types of lesions in which the roentgenoscopic signs of ulcer are not in evidence. Consequently, there is a fair-sized group of bleeding duodenal ulcers and bleeding from areas of duodenitis in which a dependable clinical diagnosis is impossible, and these cases must fall into the group of indeterminate gastro-intestinal hemorrhage with the cause of the hemorrhage remaining unexplained until surgical exploration is carried out.

In 1930 roentgen diagnoses of all types of duodenal ulcer were made in 1,684 cases; in 527 of these (31.3 per cent) operation was performed, in nineteen of which exploration was done and ulcer was not demonstrated. In the same year there were twenty patients operated on following a clinical diagnosis of duodenal ulcer and evidence of duodenal ulcer was not detected by the roentgen rays but duodenal ulcer was found at operation. In other words, during that year there were thirty-nine of 527 surgically checked cases in which the characteristic roentgen-ray signs of duodenal ulcer were not visualized.

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Submitted for publication March 5, 1932.

In a recent publication Moynihan referred to deaths occurring due to gastro-intestinal hemorrhage from acute gastro-duodenal ulceration. Acute gastro-duodenal ulceration may occur in the presence of systemic infection. This, of course, may be the cause of the hemorrhage in some cases of the indeterminate group; however, it probably is of rather infrequent occurrence.

It has been suggested that gastro-intestinal hemorrhage may come from the gallbladder, but positive evidence to substantiate this has been lacking, and the consensus of opinion is strongly against this possibility. Recently a patient having had a gastro-intestinal hemorrhage followed by severe secondary anemia had an exploratory operation to discover the source of the bleeding. A carcinoma of the ampulla of Vater was found. In this case jaundice had not been present.

During the four years of 1927, 1928, 1929, and 1930, a diagnosis of indeterminate gastro-intestinal hemorrhage was made in seventy-five cases. These patients all gave either an indefinite history or no history, except that associated with the hemorrhage. Of this group of seventy-five cases, only eighteen came to surgery. In ten cases the bleeding lesion was found; in two cases an intrinsic gastric lesion was found, there being no evidence present that the lesion was responsible for the bleeding; in five cases the exploration was negative; however, the stomach and duodenum were not opened, and in one case no explanation was found for the bleeding after the stomach had been opened.

Gross bleeding in carcinoma of the stomach is much less frequent in contrast to that from gastro-duodenal ulcer. Although the lesion in cases of carcinoma of the stomach may not be diagnosed by roentgenograms as such, it is very unusual that a diagnosis of a normal stomach is made in the presence of carcinoma.

In 1921 Eusterman and Senty reported twenty-seven cases of benign tumors of the stomach which had been examined at The Mayo Clinic between the years 1907 and 1921. The salient points brought out were: (1) myoma and fibroma were the most common benign tumors and polyposis was the least common; (2) the ratio of benign to malignant gastric tumors was about 1 to 200; (3) symptoms were not present in any of the twenty-seven cases, in seven of which palpable tumors were present; in ten, recurrent gastro-intestinal hemorrhage had occurred; (4) roentgenologic signs* of large benign gastric tumors could not be distinguished from those of malignant lesions of the stomach, and (5) gross hemorrhage or occult bleeding producing severe secondary anemia, and occasionally a picture of pernicious anemia, is the most outstanding clinical characteristic of benign gastric tumors.

In 1930 in the clinic there were 365 cases in which successive roentgenograms of the small bowel were made. With the exception of two cases, one a case of tuberculous enteritis and another a case of chronic ulcerative colitis which had extended into the ileum, roentgenograms of the small bowel in the absence of obstruction were of no value. As an example, five cases are mentioned in which roentgenograms were of no assistance, gastro-intestinal hemorrhage being a symptom. The cases are as follows: (1) fibrosarcoma of Meckel's diverticulum; (2) pedunculated lipoma of the jejunum; (3) inoperable growth of the ileum; (4) bleeding ulcer of the ileum near the base of a Meckel's diverticulum, and (5) carcinoma of the jejunum without obstruction.

In 1931 several lesions of the small bowel have been visualized by the roentgen rays. In attempting to explain certain cases of secondary anemia, Conner found successive positive tests for blood in the stool. Following a process of elimination of the remainder of the gastro-intestinal tract by roentgen-ray examination, a clinical diagnosis of probable lesions of the small bowel was made, and the lesion was found surgically. Five such cases occurred in one year.

In cases in which the history is not definite and in which the data are negative, the possibilities of cirrhosis of the liver, Banti's disease, and diseases of the blood should be ruled out.

Roentgenoscopic studies of the colon are so accurate, especially since the injection of air following evacuations of the barium enema, that errors in the diagnosis of lesions of the colon are practically nil. In a review of the cases of gastro-intestinal hemorrhage, it was noticed that diverticulosis of the colon was frequently found. Hemorrhage from diverticulosis, to our knowledge, has not been seen in the clinic. In conclusion, it might be suggested:

*Since 1921, due to the increasing roentgen-ray knowledge of these lesions and with improvement of technic, an accurate diagnosis of benign tumors of the stomach has been made in a high percentage of cases.

1. In a surgical exploration for the source of gastro-intestinal hemorrhage in which the bleeding lesion is not found, the abdomen should not be closed until the stomach has been opened and explored for intrinsic lesions.

2. In cases of recent hemorrhage a healed or chronic duodenal ulcer should not necessarily account for the hemorrhage.

3. Infrequently gastro-intestinal hemorrhage occurs from esophageal varices in the presence of cirrhosis of the liver which is impossible to diagnose clinically. The hemorrhage is usually manifested by hematemesis and rarely by melena alone.

4. All cases of recurrent gastro-intestinal hemorrhage should have surgical exploration, and in many cases of indeterminate gastro-intestinal hemorrhage it might be extremely detrimental to the patient not to explore surgically because of only one attack of hemorrhage.

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THE Public Health Service of the United States is an unique institution. It is the oldest Federal public health group in the country; it was organized in 1798. Its medical corps is composed of doctors, from the Surgeon General at the head, to its lowest commissioned officer, assistant surgeon. Dentists and sanitary engineers are also included among its commissioned officers.

Doctors are without doubt a most individualistic body. They have existed from time immemorial without any head or director. They trace their cult to Æsculapius and take their code of ethics from Hippocrates, and every one is a law unto himself after he qualifies for the practice of his profession. Yet out of this group there has been built up an organization that functions without friction not only among its own members but with the great body of physicians in general.

It is not an organization that has sprung full-grown from an act of Congress, but rather one that developed and has grown up with the nation. It came into existence in the early days of the Republic. Washington had only just retired and John Adams was conducting the administration. A bill was introduced, the purpose of which was the care of sailors who were ill. It was a noble and humane gesture on the part of Congress to provide for the sailors; but, like many gestures, it had an inside story. The Merchant Marine of that time was a very promising industry, but not strong financially. By an old law of the sea, shipowners were responsible for the care of their sailors that fell ill, and, as sanitary laws were unheard of at that time, there were many of them ill. This bill was drawn with the intention of benefiting the shipowners, and it passed, through sympathy for the sick sailor; and thus the Marine Hospital Service, the seed of the present United States Public Health Service, came into existence.

There is something fascinating in the study of an organization that has existed over the century mark, for it shows the combined results of several generations of thought and experience.

The Marine Hospital Service required funds for its maintenance then as it does now; but to-day Congress appropriates several millions for this purpose, while in the early times its expenses were met by an assessment on the wages of the sailors of twenty cents per month. This assessment was not left to their good will, but was collected by the "Customs" officers. Then it was turned into the United States Treasury, where the Secretary of the Treasury of those far days doled it out to the Marine Hospitals according to their needs. This explains why originally the Public Health Service was under the Department

of the Treasury, where it has remained even to this day.

Later the sailor's assessment was raised to forty cents per month. Though this was changed in the course of time, there are still living sailors who can boast that they assisted in building the hospitals that are now caring for them. The sailor's assessment was later abandoned for a tonnage tax, and it would be interesting to know just who introduced a bill and secured its adoption that on its face was against the interests of the powerful shipowners of the time and in favor of the sailor, who never had very much power in Congress. Or did the ship-owners in the interest of justice sponsor such a bill? However this was, the burden was lifted from the shoulders of the sailors and put on the shipowners, where some say it originally belonged.

The name of an organization is often a sort of compressed history of its origin and object; but the Marine Hospital Service in its frequent changes was more, for it shadowed dimly the trials through which the young nation passed, before its real meaning, of many people, with many ambitions, united under one Government for the common good, could be fully grasped.

During that "internecine" struggle referred to as the "civil" war, Marine Hospitals situated in the South in some instances gave "comfort and support" to those who were considered "enemies" by the United States Government. Just whether this was treason or patriotism could only be determined by the outcome of the war. It might also have been simply a humane act.

There seems to have been a sort of penal intention, however, in the change of the old and honorable name of Marine Hospital Service to that of Federal Service. Perhaps on account of its offensive educational value, this name did not last long and in 1902 it was changed to the "Public Health and Marine Hospital Service." This name was not without an irritating reminder either. In 1912 the slate was wiped clean and it became the United States Public Health Service —a broad title which it is carrying gallantly.

The United States Public Health Service has ramifications not only in every State in the Union but in every civilized country. It has a research laboratory, the National Institute of Health in Washington, that is perhaps unequaled, and a body of five thousand officers and employees, with almost that many more doctors in coöperation with it. In 1889 it was reorganized along quasimilitary lines; its officers are commissioned by the President and its ranks are similar to those of the Medical Department of the Army.

At the present time it functions under eight administrative divisions—Scientific Research, Marine Hospital and Relief, Foreign and Insular Quarantine, Domestic Quarantine, Sanitary Reports and Statistics, Venereal Diseases, Mental Hygiene, Personnel and Accounts.

Though the words "Marine Hospital" were dropped from the title it did not mean that the service for the sailors was abolished. One of the most active divisions of the Public Health Service is that of Marine Hospitals and Relief. It has twenty-five Marine Hospitals and a large number of outpatient stations and contract hospitals, for it was from the beginning the policy of the institution to contract for service in hospitals already built except where it is not economical to do so. This is a plan that might have been followed with great economic value to the nation by more recent institutions.

There are constantly more than four thousand sailors and others having a legal right to treatment in these hospitals, besides nearly double that number of out-patients.

The first dental officer was appointed and commissioned in 1919, and during the last fiscal year 52,763 patients received dental treatment.

The cost of maintaining the Marine Hospital Service is a little over five million dollars yearly, and about one-tenth of this amount is returned through various pay patients, including immigrants. The cost of running these hospitals is estimated at four dollars per patient per day.

The first Marine Hospital was built in Norfolk, Virginia, and the second in Boston. The Marine Hospitals antedated the Navy Hospitals, and it was the old Boston Marine Hospital that cared for some of the American seamen wounded in the war of 1812 fighting under Captain Jacob Jones, as well as his English prisoners. The Marine Hospital for the tuberculous at Fort Stanton, New Mexico, was built in the days when climate was unduly exalted in the cure of this disease, which accounts for its location, more like a "hideaway" than a place for a public institution. The same might be said of the old military hospital at Fort Bayard, now of the Veterans' Administration in the same state, which is in the heart of the desert. However, the advantage of a dry, warm climate in the treatment of tuberculosis is not even in this day to be

scoffed at. The rule of this hospital was to admit only those who had a good chance of recovery. This action was of great psychological value at a time when it was difficult to convince even doctors that tuberculosis was not a fatal disease. It was here that the admirable custom was introduced of providing pay work for the patients nearing their discharge, not only for the mental effect of earning but also to test out their recovery.

The National Leper Home at Carville, Louisiana, is also under the supervision of the Public Health Service. Three hundred and sixty patients are being cared for at present, and very extensive research work is carried on with the object of control and cure of leprosy. While Chairman of Rehabilitation for the National American Legion Auxiliary in 1922 I visited this home, in the interest of eleven former service men whose much sadder fate than to die on the battlefield was to contract this disease. The place was in good sanitary condition, and paid employment is furnished to practically all patients capable of performing small services and desirous of being employed. Approximately fifty-five different patients with salaries ranging from $15 to $30 per month are constantly employed in keeping clean the cottages that are occupied by lepers, feeding the blind and carrying out simple nursing procedures under competent direction. They are also encouraged to keep vegetable and flower gardens and to raise chickens and indulge in other enterprises that may properly be undertaken on the reservation.

Besides its hospitals, the United States Public Health Service has in charge many other marine activities that make for the welfare of the public. All American boats are required by law to carry at least sixty-five per cent "able-bodied seamen," and their physical fitness is passed on by medical officers of this Service. It also gives instructions in first aid at forty-three different ports to prepare officers to meet the demands of the Steamboat Inspection Service. It examines all persons seeking license as pilot, master, mate or engineer for vision and color vision and general physical condition, all of which make for safety in traffic by the sea.

The Public Health Service stands ready and equipped to take its place at any point of danger from disease, whether the call comes from the State or Municipal Officers or is an order of the National Government. Doctors fighting an epidemic in any part of the country can and do call on it for advice and assistance. From 1919 to 1922 it was the principal agency designated to care for the hospitalizing of the sick and wounded of the Great War, and it will always be a matter of regret to the nation that this service was not expanded to meet that need instead of creating an entirely new organization, of which the best we can hope is that in time it will come to learn as much as the Public Health Service already knows.

The Public Health Service was the first to use the radio for broadcasting talks on health and it answers, through certain designated Marine Hospitals, all calls from the sea through the radio for advice in case of sickness on shipboard.

The gateway to immense activities for the Public Health Service was "Quarantine." This was most nautral, as its doctors in the Marine Hospitals in different ports were the first to come in contact with plague, smallpox, yellow fever and typhus, carried in by ships. As railroad traffic increased, infected patients often quickly scattered through the country, and coöperation with the various State Health Officers became an urgent need. It was some time before the different States saw the necessity for some central authority for the prevention of the spread of disease, for these were the days when "State Rights" was a burning question. Eventually a system of national quarantine was established. We think very little and know very little about this great sheltering activity that stands guard over the health of the nation.

The ordinary lay person has no idea how many times the specter of bubonic plague has stood even with a foot on shore at our ports and how promptly it has been met by quarantine. Nor have we any conception of what the plague can do to a country once it is established. We have never seen whole towns and cities left as desolate as a forest swept by a fire. We have some idea of the ravages of yellow fever, for this country has seen an outbreak that brought death and desolation to many Southern cities and that advanced as far North as New York. That we have been saved the terrible scourges that so often devastated Europe, and that are still devastating India and China, is due to our active and competent quarantine.

There is no body of men to whom this country owes more—not even excepting those who laid down their lives to preserve the Union—than to

the doctors who at the imminent risk of their own lives fought and are fighting the unseen foes that again and again menace our shores. The brunt of this battle is met by quarantine under the direction of the Public Health Service.

It works under two divisions, Foreign and Domestic. The Foreign gets its information on any outbreak of disease or the possibility of infected ships entering our ports from the office of the American consuls abroad, from its medical officers, and from the nations themselves. The American consuls in turn get their information from the health officers in the different countries where they are stationed and from whatever other sources possible. A weekly bulletin of health at foreign ports is dispatched to the Public Health Service and when necessary a cablegram is sent. It has happened that ships sailing from ports where epidemics broke out after their departure had their first information of the fact on entering our ports. This was in the days before radio broke the silence of the air.

Domestic quarantine is carried out in coöperation with the health officers of our States and cities. It was established in 1910 and functions along these lines: Enforcement of quarantine between the States, control of the water supply on railways and steamboats and all interstate carriers, sanitation in the national parks in cooperation with the National Park Service, prevention of trachoma, studies in rural health sanitation, annual conference of State and territorial authorities with the Public Health Service.

The first paragraph of the regulations of the Division of Domestic Quarantine under the Public Health Service is very instructive:

"For the purpose of interstate quarantine the following diseases shall be considered contagious and infectious diseases: Plague, cholera, smallpox, typhus fever, yellow fever, typhoid fever, paratyphoid fever, dysentery, pulmonary tuberculosis, leprosy, scarlet fever, diphtheria, whooping cough, epidemic cerebrospinal meningitis, anterior poliomyelitis, Rocky Mountain spotted or tick fever, gonorrhea, chancroid, anthrax, influenza, pneumonia, epidemic encephalitis, septic sore throat, rubella and chickenpox." Paragraph two of the same regulations provides:

"Any person or thing, either living or dead, which has been unduly exposed to, or in intimate contact with or is infected with any of the diseases enumerated in Section One, except as otherwise provided in these regulations, shall be regarded as contagious or infectious until the contrary has been proven and if found in any car, vessel, vehicle or conveyance undergoing interstate transportation shall be subjected to such inspection, disinfection or other measures as may be necessary to prevent the spread of infection from them."

It may be seen from the foregoing that this activity alone involves a tremendous amount of work and carries a great responsibility. The appropriation for this division for the year ending 1929 was a little over half a million dollars, for the interstate quarantine work, rural sanitation, trachoma and plague work and other activities.

One of the most important activities of the Public Health Service is its investigations of the diseases of man. These studies are conducted both in laboratories and in the field. The principal laboratory of the Public Health Service for the conduct of such studies is the National Institute of Health located at Washington. There are several other laboratories, such as the laboratory at Cincinnati, where the Stream Pollution studies are conducted, and the laboratory at Hamilton, Montana, where vaccine for Rocky Mountain spotted fever is prepared.

The studies relating to malaria, pellagra, various industrial hygiene problems and similar matters of interest to the public health are conducted at various places throughout the country where favorable opportunities present themselves for such investigations.

While it is true that in the United States as elsewhere a large amount of research connected with the safeguarding of public health is carried on by private agencies, there are, nevertheless, compelling reasons why the Federal Government itself should be represented in this field. A careful analysis will show that by far the greater part of the research work conducted under private agencies is directed to the solution of problems that are almost entirely local, or problems that pertain to curative rather than to preventive medicine. On the other hand, the Federal Government, being interested in the welfare of the entire population, concentrates its efforts upon problems affecting large groups and upon preventive rather than curative methods.

There are problems requiring observations widely distributed in a geographical sense, and other problems which can be solved only by the

concentration of many different research activities working in coöperation and simultaneously. In addition to all of these reasons, there is, of course, the Government's obligation to promote the welfare of the people—an obligation that is not shared by outside agencies which, properly enough, have their own end in view in many of their activities.

Many contributions to modern hygiene and medicine have been made by the research workers of the Public Health Service. Observations made by a Service Officer as to the incubation period of yellow fever materially aided in the discovery of the method of its transmission. Studies made by the Service have shown that pellagra is a disease caused by improper diet and that the prevention and cure of the disease lie in eating a well balanced diet. The identification of the American species of hook-worm as the cause of a widespread anemia was accomplished by an officer of the Service and has resulted in a notable diminution of the prevalence of this disease. The cause of tularemia, or rabbit fever, a newly identified disease epidemic in the United States, was discovered by an officer of the Public Health Service. This disease has now been found in all of the States except three or four of the New England States. It has also been recognized in Japan, Canada, Russia and Norway.

An officer of the Service has developed a vaccine for the prevention of Rocky Mountain spotted fever, a highly fatal disease prevalent in certain of the Western States.

Within the past few months announcement has been made of the discovery by research workers of the Public Health Service that the flea is the means of spread of epidemic typhus fever, a Public Health problem recognized in the United States within the past few years. In connection with these studies, it has also been found that Rocky Mountain spotted fever, formerly thought to be confined to the Rocky Mountain region, has probably existed along the Eastern coast of the United States for several years. Cases formerly believed to be a severe type of typhus fever have now been positively identified as Rocky Mountain spotted fever of the Eastern type.

With the occurrence a year or two ago of an entirely new disease which came to be known by the name of "Jake" paralysis, or "Jamaica Ginger" paralysis, the Public Health Service was called upon to assist in the study of this problem. The exact cause and means of prevention of the disease were worked out by the Service. It was found to be caused by the drinking of Jamaica ginger extract which had been adulterated with tri-ortho-cresyl phosphate. The prevention, of course, is obvious; avoid drinking Jamaica ginger containing this poisonous substance.

In 1929 the Narcotic Division was established for the care of the victims of habit-forming drugs and out of this sprang the Division of Mental Hygiene for the scientific study of the causes that lead up to drug addiction. Another act of the same year authorized the care by the Public Health Service of all prisoners in Federal institutions.

From this brief account it will be seen that the Public Health Service is a most powerful body for the promotion of the public health. The fact that it is not a voluntary organization but directly under the control of the Government adds to its usefulness and stability. The secret of its cooperation with the doctors outside its ranks is that all doctors are bound together by the tie of a single purpose, which is service to the human race.

It is extraordinary that such a force so intimately connected with our personal good should be so absolutely unknown to the great majority of the people, and this can be explained only by the fact that it does not advertise itself. This is of course in keeping with the noble ethics of the profession; but if we persist in being unknown except through our work, we will run a great chance of not being appreciated. However, in this age it is refreshing to find any group satisfied to be known by their works only.

CERTAIN TYPES OF DIARRHEA OF UNCERTAIN ETIOLOGY*

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THE inaccurate term "colitis" has come to cover a multitude of abdominal complaints, which vary from dyspepsia to severe diarrhea or partial intestinal obstruction. The loose application of this term in given cases has led not only to delay in correct diagnosis, but has caused many patients to feel that they have serious intestinal disease. I think the term should be sharply restricted in application to those cases in which actual inflammation of the colon can be demonstrated. But after this group is definitely established, there remain fully two-thirds of the patients who also suffer from, or are annoyed by, diarrhea, and it is this larger group which taxes the ingenuity of the physician and constitutes a generous part of the clientele of the food faddist, the quack, or the irrigator of colons. It is to the condition of patients of this group to which the term "colitis" should not be applied; the designation should be "disturbance in function of the colon," and care should be taken to emphasize that there is no true inflammation of the bowel.

In all cases of diarrhea, careful studies of the history and of evidence disclosed in the laboratory are conducted, stools are examined for parasites and ova; often cultures of stools are made; sigmoidoscopic examination, roentgenographic studies, analysis of gastric content, and often special examinations such as basal metabolism or cholecystograms are employed.

In cases of the four types of diarrhea which I shall consider, the studies mentioned have been carried out, and normal conditions have been found or else the findings bore no relationship to the diarrhea. True, Endameba histolytica may be present, and may be eradicated, and yet the intestinal symptoms persist. Anti-amebic treatment should always be carried out if the parasite is found, and often a therapeutic trial of emetine is valuable fully to rule out the possibility of unrecognized amebiasis.

From this large group of patients with diarrhea of uncertain origin, I have tried to distinguish four types which constitute only a part of the entire number of types.

IRRITABLE COLON

This term refers to a group of patients with intermittent or steady diarrhea, and often periods of constipation. They constitute the bulk of those who are considered to have "mucous colitis," "spastic colitis," and so forth. To them "colitis" is often a most important and serious condition, and they direct much thought to their abdomen. Their health and general appearance, except those who have been following freak diets, is good. They are not so much sick as they are annoyed by the intestinal irregularity interfering with work and pleasure. Frequently, constant use of cathartics or of daily colonic irrigations are outstanding features. I am continually impressed by the fact that these patients have all followed well-meaning but useless diets, and that their bowels have been "washed and washed."

Emphasis should be made on the absence of true colitis—the function of the intestine, rather than its structure, is disturbed. A simple, bland, and yet assorted diet is outlined. Use of purgatives and enemas is discontinued, although a small, warm, saline enema at bedtime may be used occasionally to aid in obtaining a good night's rest. If constipation is in the foreground, warm retention enemas of olive oil, of about 2 ounces (60 c.c.) are helpful. Mild sedatives should be used as needed, but other drugs are seldom indicated. Logan has often stressed that it is this group of people that needs a wise friend, rather than a specialist on the bowel. A vaccine prepared from intestinal organisms, to which the patient is sensitive, has been tried in some of these cases, as well as in some of the cases of allergy. Our results have been none too encouraging. This procedure is worth considering for some resistant, long-suffering patients, but I am not enthusiastic about its value. A few patients have received great benefit from a systemic reaction, preferably fever, following injection of a foreign protein such as peptone or typhoid vac-

*From the Division of Medicine, The Mayo Clinic, Rochester, Minnesota. Read before the Billings Medical Club, Rochester, Minnesota, March 25, 1932.

cine. Miller, Alvarez, and others, have reported good results in some cases.

REFLEX DIARRHEA

In smaller groups of cases the disturbance is of the reflex type. By this I refer to diarrhea which follows an attack of appendicitis, cholecystitis, pelvic infection or which occasionally is a prominent symptom of duodenal ulcer. Also, diarrhea is not uncommon as an early symptom of cardiac decompensation. Diarrhea frequently accompanies menstruation as a disturbance reflex. In other words, the intestinal activity is the result of a disturbance in some other organ, and its treatment rests entirely on the ability to correct this disturbance. Too frequently, cases of chronic diarrhea are seen in which the appendix, gallbladder, or uterus has been subjected to operation "in hopes that" and so forth. That the attempt is probably sincere does not make it useful. Unless a clear-cut cause and effect can be established, operation should not be undertaken for the purpose of curing diarrhea.

ALLERGIC DIARRHEA

Diarrhea and abdominal distress certainly constitute an intriguing field for the enthusiast in allergic problems. So much of the gastro-intestinal tract is inaccessible and the present tests are so unsatisfactory that it becomes all too easy to consider a case of diarrhea as probably allergic in origin. There are a number of cases which unquestionably are of allergic causation; these are the cases in which there are intermittent sharp spells of diarrhea. Some patients come to know what foods precipitate trouble, but others may find it necessary to keep a food diary in order to identify the offending substances. In cases in which the disturbance is steadily present, the elimination diets described by Vaughn or Rowe may eventually give a clue. But with gastro-intestinal allergy, just as in allergy affecting other systems, the problem is not solely that of hypersensitivity to one food or group of foods, but rather a complex arrangement of the entire body, so that when fatigue, infection, worry, and so forth, are in a certain mixture, the explosion may occur. All are familiar with the person who can eat a certain food at a certain time without distress, whereas at another time it will precipitate headache, urticaria, or diarrhea.

For patients of this group, the diet, as always, should be as full and varied as is possible and foods must not be omitted unless they are definitely shown to cause trouble. Mild sedatives, judiciously used, are often helpful. Any factors contributing to decreasing general resistance should receive attention. Removal of a definitely diseased gallbladder, of active oral foci, or of a diseased appendix may indirectly improve the condition of these people, but such procedures should be carried out only after careful, conservative study. Indiscriminate procedures merely add to the nervous load and make it more and more difficult eventually to rehabilitate such a patient. I have felt that sodium ricinoleate (soricin) was of definite value in some of these cases. A member of our staff, who was intolerant of chocolate, remained tolerant to it for eight months after taking soricin three times daily for a month. Just recently, his hypersensitivity has recurred, and the recurrence came concurrently with a periapical dental abscess. I think that removal of the tooth and perhaps another month of taking of sodium ricinoleate will again increase his tolerance of chocolate.

DEFICIENCY DIARRHEA

Diarrhea as a result of dietary deficiency is not uncommon. It may follow faithful adherence to a deficient diet which was originally prescribed for an intestinal upset. The original cause may subside, but if the patient continues on the diet too long dysfunction may persist, I think because of the deficient diet. Or again, diarrhea may follow a limited diet which was undertaken to reduce weight, to control symptoms of ulcer, to control diabetes, and so forth. Usually these diets are self-imposed, or else are suggested by faddists, but unfortunately we cannot place absolutely all the blame for silly diets on quacks or deluded persons.

The stools of patients are usually not just the watery, mucus-containing stools of the types previously described, but are likely to be of greenish or grayish color, to have a foul odor, to occur mostly in the morning hours, and to be somewhat frothy. Secondary anemia is the rule. Stomatitis is common, and cramps of the extremities are frequently noted. The illness of these patients depends on the extent of dietary deficiency, as well as on the duration of the deficiency.

These patients closely resemble those who have true sprue, and some have features of pernicious

anemia. Although the diagnosis of sprue may be difficult to exclude, careful studies of blood smears usually will settle the doubt of pernicious anemia. As a matter of fact, I think these patients really could be classed with those who have sprue; the difference is largely one of degree of severity, and that the patients of the type considered here are not subjected to the added influence of the heat of the tropics.

In treatment, the diet should be of low residue but highly nutritious. Rare beef is the chief food, with which may be included gelatin desserts, rice, clear soups, and toast. Vegetable purée and fruit should be added as rapidly as is consistent with the patient's progress. Milk is often poorly tolerated, as well as being bulky, and hence should not be included as a routine.

I feel that large doses of calcium are helpful, and prescribe 4 gm. of calcium lactate to be taken three hours after each meal. Large doses of iron, 6 gm. of ferric citrate daily, are given, if the patient is anemic. Since the iron may cause increase of the diarrhea, this dose may need to be decreased. Again, irrigations are not to be considered as a routine, although a warm saline enema at bedtime may be employed occasionally. Liver extract and ventriculin have been valuable in some of the more severe cases, especially in those which closely resemble tropical sprue. Biologic preparations are probably more of value from the standpoint of deficiency than they are for overcoming the anemia.

COMMENT AND SUMMARY

Since the greater number of cases of intermittent or steady diarrhea have proved difficult of accurate diagnosis, and since treatment frequently has been bizarre and unsound, I have endeavored to classify the cases into various groups or types. Only four types are considered at this time.

Unquestionably, the factors that serve most to prolong or even to produce diarrhea are fantastic diets and irrigations given as a routine. Less frequently but still too often ineffective surgical procedures are undertaken. By no means is operation to be opposed when reasonably indicative data are obtained, but removal of an appendix or a gallbladder simply because of chronic diarrhea is usually followed by nothing but dissatisfaction of everyone concerned.

In general, drugs play a minor part in treatment. The inert powders, such as bismuth or kaolin, may be tried, but often they seem merely to add to the material which must be excreted. In acute exacerbations, brief usage of narcotics, such as camphorated tincture of opium, is indicated but such a drug must not be too easily available to the patient. I have often stressed the value of a therapeutic trial of emetine hydrochloride to rule out fully the possibility of endamebiasis. Calcium lactate seems helpful in many cases of chronic diarrhea; perhaps it serves to restore the calcium balance, which is always disturbed in diarrhea. Sodium ricinoleate (soricin) seems to aid in allergic diarrhea but it is too new a preparation to have fully proved its value in these cases.

General improvement of physical and nervous condition is important. The judicious use of mild sedatives is often very helpful. Friendliness and common sense in the treatment of many of these cases is of more value than too great knowledge of bacterial flora, stasis, and so forth.

RENESOL

Nurosol Laboratories, Inc., sold "Nurosol" for epilepsy. Renesol Laboratories, Inc., sells "Renesol" for epilepsy. Nurone Laboratories, Inc., sells "Nurone" for epilepsy. Educational Division sells "Renesol" for epilepsy. Vitosol Corporation sells "Vitosol" for epilepsy. Phenoleptol Co. sells "Phenoleptol" for epilepsy. These are various trade names used by Charles Goldblatt and Maurice E. Goldberg in selling Phenobarbital (luminal) at an exorbitant price and under various trade-marked names as a "cure" for epilepsy. Of course they are much too shrewd to declare frankly that their many-named nostrum is a "cure," but the whole trend of their advertising is such as to lead the public to believe that they have a cure. The A. M. A. Chemical Laboratory made an analysis of Renesol. This analysis concluded that each capsule of Renesol contains essentially 0.064 Gm. (approximately 1 grain) of phenobarbital, to which has been added a small quantity of sodium bicarbonate. While epileptics could purchase 65 1-grain phenobarbital capsules for less than a dollar, they pay $4.50 to the Goldblatt-Goldberg combination for the same stuff sold under various fancy names with no warning as to the products' potentialities for harm. (Jour. A. M. A., February 20, 1932, p. 658.)

THE DIFFERENTIAL DIAGNOSIS OF JAUNDICE WITH SPECIAL REFERENCE TO CONGENITAL HEMOLYTIC JAUNDICE*

REPORT OF CASE

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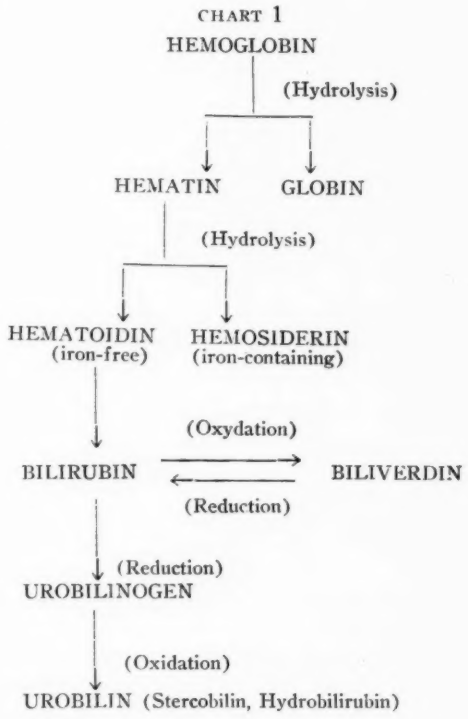
Minneapolis

THE patient whom I am about to present is of considerable interest because of certain clinical and laboratory findings which are of great diagnostic importance. The patient, as you see, is markedly jaundiced. He states that he has been jaundiced since the age of eight, following an attack of typhoid fever. He says he has never been very husky but has enjoyed fairly good health in spite of the continuous and persistent jaundice for twenty years. At the onset of the jaundice, a mass was located in the left hypochondrium which was diagnosed as an enlarged spleen. The jaundice is of an intensity which one would designate as Grade 2; it is especially marked on the conjunctivæ. Before going into any discussion of the differential diagnosis of this case it might be well to consider briefly the general subject of jaundice and to try to determine where such a case as this should be classified.

The term jaundice may be defined as a condition characterized by a yellowish staining of the skin, mucous membranes and body fluids with the bile pigment bilirubin. It is an important symptom or finding which may be brought about by a large variety of conditions. Jaundice is generally classified as: (1) obstructive; (2) toxic or infectious; and (3) hemolytic. The bile pigment bilirubin which causes the jaundice is a derivative of hemoglobin and its production (Chart 1) may be briefly outlined as follows:

The red blood cells as they are taken up by the reticuloendothelial cells of the body, especially in the spleen, liberate the hemoglobin which is first changed into globin and hematin. The hematin is converted into hemosiderin and hematoidin, of which the latter is converted by the reticuloendothelial cells of the spleen, bone marrow and liver ("Kupffer cells") into bilirubin. The bilirubin is carried in the blood and through the portal vein to the liver, where it is taken up in the liver capillaries or sinuses by the parenchymal polyhedral cells and is excreted into the bile radicals, then into the bile ducts and finally into the duodenum. The bile can be easily obstructed in its flow since it is secreted under very low pressure. Within the intestinal tract the bilirubin

CHART 1



is altered through the action of bacteria into a reduced substance, urobilinogen. Part of this urobilinogen may be changed into urobilin and excreted through the feces as such (hydrobilirubin, stercobilin) along with a trace of urobilinogen. A portion of the urobilinogen is reabsorbed into the portal vein and carried back to the liver, where normally it is reconverted into bilirubin (and hemoglobin?) and again excreted.

*Presented before the Hennepin County Medical Society, Minneapolis, March 30, 1932.

Normally the urine contains no urobilinogen, but may contain a trace of urobilin. Figure 1 shows a sketch of a portion of the liver lobule after MacNee. This sketch tries to present the polyhedral parenchymal cells of the liver arranged in structures resembling test tubes with the open

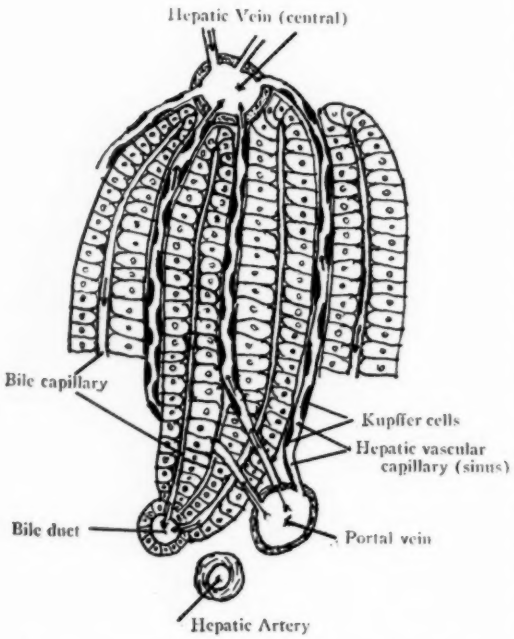


Fig. 1. Diagram of section of liver lobule (after McNee).

ends emptying into the bile duct. Along the cords of these liver cells run the liver capillaries or sinuses lined by reticuloendothelial cells, the so-called Kupffer cells. The blood from the portal vein runs through these sinuses and empties into the central hepatic veins.

Bearing this picture in mind, the three types of jaundice may be visualized in the following manner: If there is some obstruction to the outflow of the bile in any portion of the bile ducts or even in the minute biliary radicals, the bile secreted by the parenchymal cells will be forced into the general circulation and thus result in *obstructive* jaundice. It should be noted that in this type of jaundice the bilirubin that is carried in the portal vein or that which is formed within the Kupffer cells has been first taken up by the liver cells and excreted normally into the biliary system, but owing to the obstruction lower down it has been forced back into the systemic circulation. This type of jaundice is produced by bilirubin which when tested with the van den Bergh reagent gives a characteristic reaction which is known as the *direct immediate* reaction.

A second type of jaundice may be produced by an excess of bilirubin circulating through the blood of the portal system as a result of increased hemolysis or destruction of the red blood cells. This excess of bilirubin as it is carried through the liver capillaries may be present in amounts in excess of what the parenchymal cells of the liver normally are capable of taking up and excreting into the bile radicals. That part which is taken up by the liver cells and excreted will reach the intestine and may be present there in normal or often in excessive amounts. However, that portion of the bilirubin in excess of the functional ability of the polyhedral cells which cannot be taken up by the liver cells will pass on into the blood of the hepatic vein and thus into the general circulation. This type of jaundice will therefore be produced by bile which did not pass through the parenchymal cells of the liver. Such bile seems to have characteristic properties in that it does not give the *direct immediate* van den Bergh test, but gives the direct *delayed*, and especially the *indirect* van den Bergh test. It is this type of jaundice that comprises the group classified as hemolytic jaundice. It must be borne in mind that the excessive hemolysis in this type of jaundice occurs through the activity of the reticuloendothelial system itself and not through the intervention of certain bacteria, parasites, toxins or poisons circulating in the blood stream, such as hemolytic streptococci, B. Welchii, or malarial parasites.

The third type of jaundice may be produced by factors in which there is neither excessive destruction of red blood cells by the reticuloendothelial system, nor is there definite obstruction to the outflow of bile through the biliary system into the intestine. This type of jaundice is the result of alterations—degenerative changes—which affect the parenchymal cells of the liver plus in some cases hemolysis of the red blood cells within the blood stream through the action of the bacteria and their toxins or metallic and other poisons. Such jaundice is known as toxic or infectious jaundice. The toxins from certain bacteria or other infectious agents or the toxic effects of certain metallic poisons such as arsenic,

phosphorus, chloroform, and the like produce this type of jaundice. As a rule such jaundice is not simple in its pathogenesis, since at the same time that the degenerative changes are produced in the liver cells some cells may become swollen to such a degree that they compress and obstruct different levels of the biliary radicals so that in addition to the disturbed functional activity of the polyhedral cells in excreting the bilirubin there is added an intrahepatic obstructive factor. This type of jaundice is therefore characterized by both a biphasic van den Bergh reaction as well as an immediate direct positive test. The biphasic van den Bergh is generally interpreted as indicative of hepatic damage involving the polygonal cells. Unfortunately this reaction occurs too frequently to be of great diagnostic importance.

In order to better understand the significance of jaundice it might be well to consider the amounts of bilirubin normally present in the blood serum. The amount of bilirubin may be measured in one of several ways. The icterus index is a measure of the bilirubin in the serum arrived at by comparing the color of the serum with a standard solution of potassium bichromate and reading off directly in the colorimeter the intensity of the yellowish color. Normally the icterus index is from 4 to 6. Between 6 and 16 lies the zone of latent jaundice, in which there is a definite increase above the normal of bilirubin in the serum but not sufficient to produce noticeable pigmentation of the skin or mucous membranes. Above 16 there is usually visible jaundice present. Another standard for comparison is the quantitative bilirubin estimation. This is generally done by means of the van den Bergh test. In this test the standard for comparison is the azobilirubin solution and we obtain quantitatively the amount of bilirubin per volume of blood. Normally there is less than .5 mgm. in 100 c.c. of blood, which means less than one part in 200,000. This figure, 1 to 200,000, or .5 mgm. per 100 c.c., is considered one unit. Normal blood contains from .2 to .5 units. Generally when bilirubin is present in amounts greater than four units, jaundice develops.

From what has been stated above it is therefore obvious that jaundice is the result of increased amounts of bile pigment circulating in the blood, hyperbilirubinemia, and that this hyperbilirubinemia may result from one of three conditions mentioned, namely: (1) increased destruction of red blood cells: hemolytic jaundice; (2) damage to the polygonal (excretory) cells of the liver: toxic or infectious jaundice (often combined with more or less of the intrahepatic obstructive jaundice); (3) interference to the outflow of bile: obstructive jaundice. Chart 2 considers briefly the main characteristics of the different types of jaundice for differential diagnosis.

CHART 2

JAUNDICE

I. Hemolytic Jaundice.
   1. Congenital, familial, acholuric jaundice.
   2. Acquired hemolytic jaundice.
   3. Pernicious anemia.
   4. Banti's disease.

   Note: Stools, normal or darker; urine, urobilin(ogen) but no bile.
   Increased fragility of cells in (1).
   No itching of skin (no increase in bile salt retention)
   Positive *indirect* van den Bergh.

II. Toxic or Infectious (Parenchymatous) Jaundice.
   1. Acute catarrhal jaundice.
   2. Acute and subacute yellow atrophy.
   3. Infectious spirochetal jaundice, yellow fever.
   4. Toxemias of pregnancy.
   5. Biliary liver cirrhosis.
   6. Luetic hepatitis.
   7. Arsenic, phosphorus, choloform poisoning.
   8. Pneumonia, congestive heart failure.

   Note: Stools, normal or lighter; urine, urobilin(ogen) and bile.
   Positive *direct* and *biphasic* van den Bergh.

III. Obstructive Jaundice.
   1. Cholelithiasis (parasites)
   2. Tumors, in or compressing ductus choledochus.
   3. Chronic pancreatitis.
   4. Carcinoma in head of pancreas.
   5. Inflammatory swelling of m.m. of ducts (intrahepatic obstruction)

   Note: Stools, clay-colored (when complete)
   Urine, bile and bile salts but no urobilin(ogen).
   Positive immediate direct van den Bergh.
   Itching of skin, bradycardia.

   Extrahepatic obstruction: colicky pain and clay-colored stools common. Liver not often enlarged or tender. Urine, bile, no urobilin(ogen).

   Intrahepatic obstruction: liver often enlarged and tender. Colicky pain uncommon. Stools normal to clay-colored. Urine, bile and urobilin(ogen).

IV. Dissociated Jaundice (rare).
   Isolated retention of either bilirubin or bile salts.
   Retention of bile salts alone, very rare.
   (May explain a few rare cases of idiopathic severe itching.)

REPORT OF CASE

Mr. H. H. D., aged twenty-eight, married, was first seen March 14, 1932, complaining of jaundice continuously for the past twenty years, an enlarged spleen of twenty years' duration, attacks of loss of appetite and vomiting, with distress and pain in the right hypochondrium. His family history is entirely negative. He is an only child. There is no history of jaundice in any members of the family as far as he knows. He had measles as a child, whooping cough and scarlet fever at 7 years, typhoid fever at 8 years, mumps at 18. He has had no operations or injuries. He was told early in childhood that he had a weak heart. His appetite is generally poor, he is constipated most of the time, voids five or six times during the day, but has no nocturia. His urine is generally dark amber in color. His habits are very good, he exercises moderately, but has been afraid to exercise strenuously because he was told at the onset of the jaundice that he should lead a sedentary life. He smokes moderately and uses no alcohol. He was fairly well up to the age of eight, when he developed typhoid fever. This ran a rather severe course of about six weeks, but he made a complete and uneventful recovery. Several months later jaundice appeared. At the same time the spleen was found to be enlarged. He developed a moderate constipation. The spleen continued to enlarge for some time. During the past twenty years he has been continuously jaundiced but at times the color would be lighter and at other times much darker. Generally during the summer months he seems to bleach out, and turn darker in the winter. He becomes perceptibly darker after an acute illness such as a cold. In spite of the jaundice he has remained in fairly good health; he has been "more jaundiced than sick." He has had no itching of the skin at any time. About December 10, 1931, he developed pain in the gallbladder region. This was thought to be due to either appendicitis, gallbladder disease or ulcer. He was given the dye for a cholecystogram but was unable to retain it and no gallbladder X-rays were taken. About March 1 he developed another attack of discomfort in the right hypochondrium with nausea but no definite colicky cramps. He has again lost his appetite and has lost a few pounds in weight.

On physical examination his height is five feet, seven inches, weight 120 pounds (maximum 127), pulse 100, blood pressure 108/78, jaundice about Grade 2, a little more intense in the conjunctivæ. His sinuses and throat are clear and there is no adenopathy. There is a marked lordosis in the mid-dorsal region towards the right, the right chest appearing more prominent. The heart and lungs are normal; abdomen is soft, the liver extends just below the costal margin, and there is some tenderness in the gallbladder region. The spleen is markedly enlarged, extends 9 cm. below the costal margin and about 13 cm. above, so that its dullness measures about 22 cm. in length and 14 cm. in width; it is not tender. The reflexes are all very sluggish. The Wassermann test is negative, the blood shows 83 per cent hemoglobin, 5,200,000 reds, 9,100 leukocytes, of which 56 per cent are polymorphonuclears, 40 per cent lymphocytes, 2 per cent transitionals, 1 per cent eosinophiles, 1 per cent basophiles. The striking picture in the blood slides is the pronounced almost uniform microcytosis. All the cells are deep staining. The reticulocyte count was 7.1 per cent. The urine was dark amber, specific gravity 1.026, entirely negative except for urobilinogen 4 plus. Careful tests for bilirubin were entirely negative. The blood showed an icterus index of 100 with a quantitative test of 83 parts of per million. The direct immediate van den Bergh test showed a very faint trace (practically negative), the direct delayed was strongly positive, the indirect reaction 4 plus. The fragility test was not entirely satisfactory. Hemolysis was marked in .50 per cent sodium chloride and was complete in .32 per cent. The normal showed beginning hemolysis at .42, and complete at .30 per cent. The hemolysis in this case undoubtedly began much above .5 per cent so that the fragility was definitely increased. A cholecystogram taken following the ingestion of kerasol capsules showed a non-functioning gallbladder.

This patient shows extremely interesting findings: jaundice that has persisted for twenty years without the usual symptoms of jaundice, during which time the patient has been more icteric than sick; a pronounced splenomegaly; a blood picture which shows a definite microcytosis with an increased reticulocyte count, a definite increase in the fragility of the red blood cells; an enormous hyperbilirubinemia (approximately twenty times the normal, and yet no bilirubin in the urine. It is quite obvious that this patient presents a classical picture, complete in almost every detail, of congenital hemolytic jaundice (Chart 3). Charts 2 and 3 present in outline form the characteristics for differential diagnosis between the different types of jaundice. One of the most striking findings in this case is the enormous hyperbilirubinemia without any bilirubinuria. This finding is obviously not in accord with the view of those who question the importance of the van den Bergh test for differential diagnosis. In obstructive jaundice where the van den Bergh test gives a direct immediate positive, an accumulation of bilirubin in the blood to a point above the icterus index of 15, or in excess of three to five parts per million, always presents bilirubin in the urine. From this it would follow that the renal threshold for the obstructive type of bilirubin is low. In the case under discussion, the bilirubin gave the enormous icterus index of 100 and a quantitative test of 83 parts per million without showing the slightest trace of bilirubin in the urine.

CHART 3

CONGENITAL HEMOLYTIC (ACHOLURIC) JAUNDICE

1. Jaundice. "More icteric than sick."
2. Splenomegaly.
3. Enlarged liver ±. Gallbladder disease and gallstones common (60 per cent).
4. Anemia ±, secondary type. *Microcytosis.*
5. *Fragility* of erythrocytes increased ++. (Hemolysis in hypotonic salt solution)

	Begins	Complete
Normal	.42 per cent	.30 per cent
Cong. Hem. Jaund.	.60–.70 per cent	.35–.40 per cent

6. Blood Serum.
   "Indirect" bilirubin excessive up to 85 per mil. Normal 3–5.
   Icteric index to 100. Normal 4–6.
   Renal threshold to indirect bilirubin very high ∴ acholuric, no bile in the urine.
   van den Bergh—direct immediate negative
   direct delayed positive
   indirect positive 4+
7. Absence of "jaundice" symptoms (itching, bradycardia).
8. *No* bilirubinuria. Excessive urobilinogen and urobilin in urine and feces.
   (Obstructive jaundice from complicating gallstones may, though rarely, confuse the picture).
9. Reticulocytes (reticulated reds), 5–35 per cent (Normal 1 per cent).

Several explanations have been offered for this peculiar property. As the bilirubin is formed and passes into the blood stream, it is adsorbed by some constituent of the plasma or blood serum. This combination through adsorption is fairly stable and results in the bilirubin becoming more resistant to oxidation, less susceptible to excretion through the kidneys, and prevents it from reacting immediately to the van den Bergh diazo test. Such a concept helps explain some of the findings in congenital hemolytic jaundice such as the acholuria in spite of deep jaundice, and the indirect van den Bergh test. Substances which tend to lower the surface tension of the serum, as for example an increased concentration of the bile salts as found in obstructive jaundice, lessens this binding of the bilirubin to some serum constituent, and the unbound bilirubin will therefore be more readily excreted by the kidneys and it will give the direct immediate van den Bergh test. Another explanation offered is the assumption that the bilirubin as it comes to the liver is altered somehow in its passage through the polyhedral cells of the liver and thereby its properties are modified. Hans Eppinger assumes that the large quantities of urobilin and urobilinogen circulating in the blood of cases of hemolytic jaundice affect the kidney parenchyma so that its threshold to bilirubin becomes high. The first explanation seems to be the more tenable, especially since the work of E. S. G. Barron,[1] who showed that the bilirubin which gives the direct reaction when added to normal serum in concentrations up to 12 mgm. per cent, ceases giving the direct immediate reaction and gives only the indirect one. When the concentration is raised above 16 mgm. per cent, reaching a point apparently in excess of the saturation point of the adsorbing substance, the direct reaction again returns.

As to the pathogenesis of hemolytic icterus, little is known. The principal process is a tremendous destruction of the red blood cells in the body. It is often familial in type so that several members of the same family have the disease. The spleen apparently plays an important part in the production of the symptoms and the findings, but is not in itself the primary cause. There is generally present an excessive production of red blood cells in the bone marrow as a result of the over-destruction of these cells. This is apparent from the marked increase in the young immature forms, the reticulated reds in the circulating blood. In some cases the reticulocytes number 35 per cent or more of the total cell count. The blood cells themselves apparently are not normal through some dyscrasia of the hematopoietic system. This is evident from the increase in the fragility of the red blood cells, one of the most characteristic features in this disease. That the spleen is not *the* causative factor of the disease is seen by the fact that after splenectomy, although the patient seems to make a good clinical recovery, with the jaundice clearing up and the general health improving, the two important findings in the blood, the microcytosis and the increased fragility of the red blood cells, usually remain unchanged. With the disappearance of the icterus after splenectomy the bilirubinemia approaches the normal, the cell count approaches the normal, and the blood picture in general outside of the two characteristics just mentioned, becomes apparently normal. A frequent complication of this disease is cholecystitis with cholelithiasis. Statistics show that about 60 per cent of the cases of hemolytic jaundice sooner or later

[1] Barron: E. S. G., Bilirubinemia. Medicine, 10:77, 1931.

develop gallbladder disease. This is explained partly by the increased viscidity of the bile as a result of the increased bilirubinemia. Occasionally the typical picture may therefore be obscured by a complication of true gallbladder disease. The one feature which was absent in the case here studied was anemia; the hemoglobin and red count were practically normal, but as aforementioned, this disease has exacerbations and remissions. During the period of greater activity in the destruction of the red blood cells the anemia becomes more pronounced, while between periods the hemoglobin may become quite normal.

SUMMARY AND CONCLUSIONS

1. Hyperbilirubinemia and jaundice result from a large variety of conditions and may form important findings for diagnosis.

2. The laboratory data, together with the history and clinical findings, permit the types of jaundice to fall pathogenetically into three fairly well defined groups: (1) obstructive jaundice; (2) toxic and infectious jaundice; and (3) hemolytic jaundice.

3. The van den Bergh test presents a definite advance in the study of jaundice, and is often of considerable aid in differentiating the several types.

4. The renal threshold of bilirubin in hemolytic jaundice is very considerably higher than that in obstructive jaundice.

5. The main characteristics of the different types of jaundice are briefly outlined in the present study for differential diagnosis.

6. An interesting case of congenital hemolytic (acholuric) jaundice is here reported.

Note.—After the completion of this paper the patient was operated on April 20, 1932, after several days of hospitalization for the purpose of reducing the bleeding and clotting time. The bleeding time was reduced from eleven to four minutes and the clotting time from fourteen to six minutes. The spleen was found large and adherent to the contiguous structures, making its removal somewhat difficult. The capsule was tense and rough and was mottled with grayish intersecting streaks and nodules of a chronic perisplenitis. It weighed 1,540 grams immediately after removal and measured 22.5 by 15 by 7.5 cm. An hour later, after a quantity of blood oozed out of the organ, it weighed only 1,180 grams, showing a loss of 360 grams of blood, which easily escaped. This gives an idea of the enormous blood content of such an organ during life, since it lost without pressure an amount equal to three times the average normal size of the spleen. The gallbladder was found definitely thickened from a chronic cholecystitis but there were no gallstones present and it was therefore not disturbed at the operation. On this date (April 25) patient is making a rapid and uneventful recovery.

TREATMENT OF HEAD AND SPINE INJURIES*

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IN the care of severe head injuries, it is most important that early and efficient treatment be instituted so the patient may have the greatest possible opportunity of surviving with the least possible mental disability. The early treatment must be directed toward preventing death within the first few hours from pressure on the cardiac, respiratory, and vasomotor centers at the base of the brain. Early treatment must also be directed toward relieving the pressure on the cortex of the cerebrum and cerebellum in order that motion, sensation, intelligence, memory, and judgment may remain unimpaired so the individual may maintain his economic and social state.

In treating head injuries, skull fracture is of much less importance than the damage done to the enclosed brain and its coverings. While extensive fractures of the skull usually are accompanied by severe damage to the enclosed structures, there are, on the other hand, many cases of serious intracranial injury where the X-ray is negative for fracture. These cases may cause a false sense of security with an underestimation of the seriousness of the intracranial damage.

*Read before the Ramsey County Medical Society on March 28, 1932.

leading to inadequate treatment, resulting in sequelæ which may be permanently crippling. On the other hand we may have definite extensive fractures, especially of the vault of the skull, demonstrated by X-ray, with little or no intracranial damage.

Fractures of the skull may be classified under various headings, but for practical purposes there are three important types:

1. Depressed fractures of the vault.
2. A depressed fracture complicating a scalp wound.
3. Fractures of the base which extend through the external auditory meatus or through the nasal passages and sinuses.

In compound fractures of the vault, when the tissues of the scalp have been lacerated, contused and contaminated, debridement is important. When in addition the dura has been torn, the subarachnoid space and the brain exposed, thorough and prompt debridement is our best means of combating meningitis and death.

If there is a probability that infection can be avoided, the fragments in a compound comminuted fracture should not be removed. If left in the wound, the fragments will heal in; if they are removed the patient will recover with a cranial defect. A cranial defect exposes the brain to trauma by removing a part of its bony covering. This is a more serious condition in the vault of the skull than in the temporal regions. A cranial defect will have a detrimental psychologic effect on the individual, in addition to which it would be a great handicap in securing employment. Indentations of the skull without depressed spicules should be left alone. Fragments of bone depressed below the level of the surrounding margins should be elevated. This is especially important in the motor areas. No operation should be undertaken until the patient has recovered from shock. A systolic blood pressure of 60 with subnormal temperature should be considered a degree of shock contraindicating surgery except for arrest of hemorrhage.

In compound fractures of the base of the skull with communication through the auditory canal, the canal should be dried with sterile applicators, swabbed with an antiseptic solution, and a sterile dressing applied to absorb the escaping blood and cerebrospinal fluid. The auditory canal must not be irrigated, as this will force infection through the fracture opening into the cranial cavity.

Fractures into the nasal passages and sinuses are a grave source of meningitis. Because of our inability to disinfect the nares, the danger of infection extending through the line of fracture is very real. Many of these patients have, either before or after coming under the care of their medical attendant, tried to clear the nose of mucus, blood, and cerebrospinal fluid by blowing, which has forced infected material and air through the fracture opening into the subdural space. To prevent meningitis developing from this source, the patient, if conscious, should be promptly instructed to "not blow his nose." The nares should be cleaned by suction or sterile swabs, after which antiseptic solutions may be applied by swabs. Sprays, atomizers, or irrigations must never be used.

In severe intracranial injuries there is a marked increase in the intracranial pressure due to an increase in the amount of the cerebrospinal fluid, to edema of the brain and medulla, or to intracranial hemorrhage. As the brain is enclosed in an unyielding bony cavity, the increased amount of cerebrospinal fluid, edema, and hemorrhagic clots will compress the capillaries in the brain, thereby depriving them of blood and its contained oxygen. The strangulation of the cells in the cortex will cause unconsciousness, and, if not relieved and the patient survives, the delicate cells in the cortex will atrophy, resulting in more or less permanent damage to brain function. If the intracranial pressure is not relieved, there is grave danger that it will extend to the so-called "vital centers" in the base of the brain and cause death by pressure on the vasomotor, respiratory, and cardiac centers located there. For the above reasons it is extremely important to relieve the increased intracranial pressure early and to keep it within safe limits if possible by the following methods:

1. The intravenous injection of 50 c.c. of a 50 per cent solution of glucose. This may be repeated one or more times in each twenty-four hours if indicated.
2. Magnesium sulphate should be given by mouth, duodenal tube, and rectum.
3. Withdrawal of cerebrospinal fluid by lumbar puncture. A manometer should be used and the withdrawal stopped when the pressure reaches normal. Ten mm. of mercury is a normal pressure; 10 to 20 mm. is a moderate increase; 20 mm. or over is a marked increase.

The spinal drainage may be repeated every few hours in extreme cases if the fluid is under increased pressure. Hemorrhagic spinal fluid is irritating to the meninges. Its removal tends to reduce post-traumatic sequelæ.

4. The head of the bed should be elevated.

5. Fluids should be restricted to a total fluid intake of 600 to 1,000 c.c. each twenty-four hours during the first few days. The water intake should not exceed 1,200 c.c. during the first few weeks. If more fluids are given, there will be an increase in the amount of cerebrospinal fluid and brain edema. The patient should be placed on a diet of solid dry food.

Subtemporal decompression was extensively employed at one time, but its use has gradually decreased during the past few years except as a measure of last resort in selected cases.

In the occasional selected case in which hypertonic solutions and spinal drainage are insufficient to control the increased intracranial pressure, a bilateral subtemporal decompression may be undertaken if the patient has survived a few hours. After the dura is opened, any fluid or blood present can be evacuated and a soft drain inserted under the brain. If only edema is present, no drain should be used. Edema and hemorrhage compressing the medulla are but little benefited by subtemporal decompression. Fractures involving the anterior and middle fossæ are benefited by decompression. Recovery depends on the amount of associated brain damage.

Patients who have suffered very severe and extensive laceration and contusion of the brain and who from the beginning have a rapid pulse, cyanosis, stertorous breathing with rapidly rising temperature are hopeless and die within a few hours regardless of what treatment is instituted.

Dr. Walter E. Dandy in a recent article maintains that in the presence of extradural hemorrhage the brain holds the dura against the blood clot, acting as a tampon. If the intracranial pressure is reduced by lumbar puncture or the intravenous injection of hypertonic solutions, the dura pulls away, allowing the vessels to again open and bleed. In cases of extradural hemorrhage with increased intracranial pressure and no blood in the spinal fluid, prompt operation is indicated. The clot should be localized, if possible, by neurologic symptoms and not by the location of the external contusion.

In selected cases it is safer to explore not by an osteoplastic flap but by one, two, or three trephine openings along the fissure of Rolando. If an extradural clot is found, the opening can be enlarged, the clot evacuated, and hemostasis effected.

In severe cerebral contusion or laceration with symptoms of cortical irritation and the presence of blood in the cerebrospinal fluid with prolonged unconsciousness, it may be assumed that a subdural hematoma is present. A fixed dilated pupil usually indicates a brain lesion and hemorrhage on the same side of the cortex. If there are localizing signs such as paralysis, twitchings, and convulsive seizures, an exploration should be considered if the patient recovers from the shock. Absolute rest in bed for three weeks in mild cases and six weeks in severe cases is a most important rule to follow in cases of head injuries.

In about 10 per cent of the cases of head trauma, the mortality rate and the permanent disability will in the future be reduced by our ability to diagnose, locate, and operate the cases of extensive intracranial hemorrhage.

SPINE INJURIES

The majority of back injuries are of relatively slight importance and recover in a few days. The major portion of such back injuries occur in the lumbo-dorsal and lumbo-sacral regions.

Very often no serious effort is made to differentiate between muscular ligamentous strains and fractures of the vertebræ. As the damaged structures of the vertebral column are so deeply situated, there may be no objective evidence of trauma. Limitation of motion is a constant sign, and all such cases should have X-ray films taken before a diagnosis is made. Some patients with fractured vertebræ may have little pain. In the absence of neurologic symptoms, fractures can only be differentiated from strains by anteroposterior and lateral X-ray plates.

Ligamentous strains are produced by overstretching of the spinal column, external violence, or sudden severe muscle pull. If there is no accompanying muscle trauma, the muscles may splint the injured area while the patient remains quiet, thereby relieving him of pain. The pain of ligamentous rupture is usually deep seated and is aggravated by movements of the spine.

Muscle strains show tenderness to pressure and to all movements in which the injured muscles participate. Active or passive movements in

the direction of the injured muscles will be relatively free from pain. Muscle strains should be immobilized for about two weeks or until the acute symptoms have subsided. Heat, light massage, and gradually increasing active exercise should then be used. Severe ligamentous strains require immobilization of from two to four weeks, after which a removable cast or spinal brace should be worn, which should be removed daily for physical therapy and exercises. If the involuntary rigidity and lameness are increased by exercise and manipulation they should be discontinued until later, and only heat, diathermy, and light massage employed.

In fracture of a spinous process there is no injury to the cord or nerve roots. In fracture of the transverse processes the roots of the nerves may be damaged. Fracture of the articular processes are common in association with dislocations of the vertebræ. The nerve roots may be damaged. In fractures of the arches the cord is often damaged.

Fractures and dislocations of the spine are important because of its dual functions of supporting the trunk and protecting the spinal cord. The spinal cord may be crushed, torn, or compressed by a dislocated vertebra or a fractured arch. An extradural hemorrhage, a subdural hemorrhage, or hemorrhage into the substance of the cord may cause injury. When the cord has been completely severed by the injury it is beyond repair. When the cord has been damaged by pressure, function will return when the pressure is relieved, by removing a compressing bone or by the removal or absorption of a blood clot.

Before undertaking treatment, a careful history should be taken. A neurological examination should include spinal puncture with examination of the spinal fluid for blood, and the determination as to whether or not spinal block is present.

Dislocated vertebræ are usually also fractured, although dislocation may occur in the cervical region without fracture. The patient should be moved and examined with great care, as sudden death may occur from pressure on the cord. Dislocations may occur with or without cord injury. There is less danger of further injury to the cord if the patient is transported in the face-down position. Forward dislocation of the upper articular facets on one side in the cervical region is characterized by the head being held rigidly in a cocked, partly flexed position. It is bent toward the side of the injury and the chin is turned away from the injury with or without paralysis of the cord. In bilateral dislocation the cord is more likely to be damaged. An X-ray may show no displacement because the body of the vertebræ, though dislocated at the time of the accident, returned spontaneously to the normal position. In dislocations the ligaments are either torn or stretched, permitting overriding of the articular facets. If dislocation of one-half inch or more occurs in any of the four upper cervical vertebræ, death usually ensues.

Cervical dislocations with or without fractures can often be reduced by placing the patient on a bed made firm with boards placed under the spring. A head suspension sling from under the chin and occiput is fastened to the head of the bed. The head of the bed is then elevated twenty to thirty inches. A suitable pillow is placed under the kyphosis. In this manner the patient is hung by his head, and his body becomes the counter-extension. This extension may effect a reduction in from one to twenty-four hours.

Reduction may be accomplished under general anesthesia by the application of manual traction with slight exaggeration of the deformity, while the head and upper cervical spine are being manipulated into normal position. The head must not be flexed during the manipulations, in order to avoid damage to the cord.

In the event of the failure of either of these maneuvers, laminectomy should be resorted to in selected cases. After reduction the head is supported in a plaster cast or leather collar for from two to four months.

The skin must be carefully watched as pressure sores easily occur on the anesthetic skin. Turning and moving the patient frequently to relieve skin pressure is important. An air cushion under the pelvis, cotton rings under the heels, and a cradle over the extremities to prevent the pressure of the covers will aid in preventing the development of bed sores. Foot drop should be prevented by suitable supports. In all cases of complete paralysis, a permanent catheter should be introduced into the bladder and the bladder irrigated twice a day. Some urinary antiseptic should also be given. All cases of complete rupture of the spinal cord sooner or later develop bed sores and an inflammation of the genito-

urinary tract develops regardless of all precautions.

Fractures of the spine are most common in the dorso-lumbar region. This is the weakest point in the spine because it is where the dorsal and lumbar curves reverse. When a spine is forcibly flexed from end to end, the body of one of the vertebræ at the dorso-lumbar region becomes crushed so the vertebral body becomes wedge-shaped. This causes a kyphosis. In these compression fractures the patient should be placed in bed with the lumbar spine supported. As the spasm diminishes, the support under the spine should be increased. A convenient way of securing hyperextension is to place the patient in a modern hospital bed with the patient's head at the foot of the bed. By elevating the knee-elevating mechanism of the bed, the kyphosis can be corrected and hyperextension obtained to any degree desired. With a tall patient a seven foot bed is required.

A plaster-of-Paris jacket with adequate over-correction of the kyphosis is the most satisfactory method of treating compressed fractures of the vertebral bodies. To secure sufficient over-correction while applying the cast, the patient should be placed on a fracture table, the back overextended and supported by a muslin bandage attached to the overhead bar on the fracture table. The plaster jacket should be applied from the suprasternal notch to below the iliac crests. Another method of securing a reduction of the kyphosis and over-extension of the spine is to support the patient in a face-down position by suspending the feet and shoulders to an overhead frame or hooks in the ceiling while applying the plaster jacket. In a compressed fracture it is usually impossible to secure a complete reduction of the crushed vertebral body, but the extension will prevent further compression and will diminish or correct the deformity. The plaster jacket should be worn for two to three months, when it may be removed and a steel supporting brace substituted. The patient may resume light work in six months to one year after the injury. If weakness or nerve root pains remain after a period of six months, an Albee or Hibbs operation may be performed to strengthen the spine.

Falls on the buttock with acute flexion of the upper part of the body may result in fractures with dislocation in the lumbar vertebræ. Fractures and dislocations of the lumbar vertebræ are the least serious of all spinal fractures because the injury is not to the cord proper but to the spinal roots of the cauda equina. They are more resistant and if the pressure is removed by laminectomy, recovery is more likely to occur. If a patient does not recover after an injury to the lumbar region of the spine, a laminectomy may prove of value as long as a year or more after an injury.

When there is cord pressure from dislocated or fractured vertebræ which cannot be relieved by extension, position, or manipulation, or where there is strong suspicion of cord pressure from a blood clot, laminectomy should be performed after the patient has recovered from shock. Although there is disagreement as to the advisability of doing laminectomy in cases of paralysis due to fracture and dislocation of the spine, occasionally an apparently hopeless case will be benefited. The greatest benefit from laminectomy will result in those cases in which there is some neurological evidence that the cord has not been entirely severed.

THE DEVELOPMENT OF TRANSURETHRAL PROSTATIC RESECTION*

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THE lumen of the male urethra is comparatively small, averaging but 0.75 cm. in diameter. Although the prostatic urethra is one of the larger portions, it is not capable of much greater dilatation than 1 cm. without undue trauma. Hence it does not require a great amount of tissue partially to obstruct it; even 1 or 2 gm. of hypertrophic prostatic tissue, in certain situations, can produce as complete obstruction as a cork in the neck of a bottle. Yet the prostatic urethra is comparatively accessible from without, and the most thorough visual examination is possible. Appreciating this accessibility, and the small amount of hypertrophic tissue capable of obstructing it, urologists have attempted to relieve the obstruction by transurethral means, even before instruments for its visual examination were perfected.

The first of these attempts was made by Guthrie, in 1834, who incised the vesical orifice with a concealed blade in a catheter, and described the procedure as "division of the bar at the neck of the bladder," thus introducing the term "median bar" into urologic literature. His procedure was identical with that carried on today with Collings' excellent instrument, with the exception that whereas Guthrie had to work entirely by feel, electricity and the perfection of lenses permit his successors to work with the operative field in full vision. Instead of the concealed knife blade of one hundred years ago, the surgeon now uses a radio knife and so encounters less bleeding. The results of the two procedures are identical: After the scarred, contracted neck of the bladder is incised, the urine flows more freely. No tissue is removed, or at best, an insignificant amount. The procedure is not intended for the correction of adenomatous hypertrophy or any other form of obstruction that requires removal of an appreciable amount of tissue. It is best described as transurethral prostatic incision, or sphincterotomy. When properly applied, the relief given is immediate and complete.

Mercier, in 1837, realizing that such cases represented but a small portion of those in which there is urinary obstruction in the prostatic urethra, devised an instrument that would not only cut the bar but actually remove tissue from it. This consisted of a tubular knife in a tubular sheath in the side of which a window had been cut. As there was no provision for control of bleeding, and as the operation had to be done entirely by feel, its application was limited.

Bottini, in 1873, endeavored to widen the application of the Mercier instrument through the better control of bleeding by substituting a galvanocautery for the knife, but the necessity of carrying the procedure on blindly still limited its application, for the operator could never be quite sure that he was burning the hypertrophied prostate gland and not the bladder itself. Moreover, the new cautery did not permit of the removal of any tissue, but simply its destruction by burning, a method which, of course, left much eschar and hence extreme secondary infection and sepsis.

Freudenberg, in 1897, added still more refinements so that the danger of the instrument slipping away from the prostatic urethra and burning the wall of the bladder was minimized, and for a time it was in quite general use. However, the procedure had to be carried on by feel rather than by vision, and its failure to remove any tissue except by its destruction through burning was a decided handicap. Satisfactory functional results following its use were the exception instead of the rule. During this same period suprapubic and perineal prostatectomy were coming into vogue. Van Dittel, in 1885, by resecting a portion of a large middle lobe in the course of exploratory cystostomy, presumably for stone, relieved the patient of urinary obstruction. Following this report, Belfield in America and McGill in England reported several cases of partial suprapubic prostatectomy followed by good functional results, a procedure which assured relief

*From the Section on Urology, The Mayo Clinic, Rochester, Minnesota. Submitted for publication February 4, 1932.

as long as the obstruction was due to the intravesical part of the hypertrophied gland but was naturally doomed to failure in cases in which the obstruction was intra-urethral and not visible from the bladder. Belfield's first patient, operated on in 1886, was described by him as having a median tumor "as large as an almond." This was twisted off; the patient recovered and thereafter was free from difficulty in urinating and from residual urine, demonstrating that the position of the obstructing tissue, not the size of the prostatic hypertrophy, determined the amount of obstruction produced. Unfortunately, this fact was not sufficiently appreciated, and when failures occurred following partial prostatectomy because of the unseen urethral obstruction which remained, the leading surgeons decided to attempt the removal of the entire gland. Fuller did the pioneering in America, and in England Freyer popularized the method, and as all obstruction was removed together with the gland, the functional results were, as a group, far superior to those following partial removal or transurethral methods. With few notable exceptions the endeavor of the urologic surgeon since that time has been to lower the mortality of prostatectomy rather than to devise some new method for removing simply the portion of the gland that obstructs. This effort to reduce the mortality associated with prostatectomy has been markedly successful, but the fact cannot be overlooked that the operation still carries a greater risk than any other surgical procedure undertaken for the correction of a benign condition. Furthermore, the functional results are not invariably good, and therefore a few dissatisfied urologists have endeavored to perfect the transurethral method of treatment.

The first of these efforts was the presentation by Young, in 1911, of his punch. This instrument resembled Mercier's, but had the added advantage that by reflected light the portion of the prostate gland to be removed could be seen projecting into the lumen of the instrument. Braasch, in 1918, added still further to the visualization of the procedure by modifying his cystoscope so that it could be used as a punch and, being open at the distal end, the entire operative field was visualized both before and after engaging the tissue to be excised. Neither instrument provided any means of hemostasis and so was of limited application, for until this problem was solved large amounts of tissue could not be removed. Caulk, in 1920, modified the Young instrument, much as Bottini had the Mercier instrument, by substituting a cautery blade for the tubular knife, but in Caulk's instrument the tissue was removed rather than destroyed in situ. This method, by reducing bleeding, made it possible to remove greater amounts of tissue than before, and, although adequate vision was not possible with the instrument, Caulk deserves great credit for keeping before the profession the possibility of correcting prostatic obstruction by removing simply the obstructing portion of the gland instead of subjecting all patients to a major surgical procedure to remove in most cases insignificant amounts of tissue easily accessible through the urethra.

I used Caulk's instrument in eighty-seven cases but since it was not possible to see the tissue to be excised until it had been blindly engaged by feel, I modified Braasch's instrument so that larger amounts of tissue could be removed and the bleeding could be controlled by electrocoagulation of the cut surface with a Bugbee electrode. In 1928, Stern of New York developed a lens instrument which excised the obstructing tissue in the posterior urethra with a wire loop electrode through which a high frequency current, much as is employed in the radiothermy knife, was used.

The instrument gave complete vision of the operative field and the high frequency current reduced the bleeding at the time of excision appreciably, but did not seal the large arterioles. For this reason the instrument did not meet with general favor until Davis, of North Carolina, so modified it that, after the cutting had been accomplished, a diathermy current would be run through the loop electrode and the remaining bleeding points controlled by electrocoagulation.

To be successful, any instrument, when employed for transurethral prostatic resection, must meet the following requirements: First, the operative field must be clearly seen and the tissue to be removed examined in its relationship to the other structures about the neck of the bladder. Second, hemorrhage must be controlled and sufficient tissue removed at the time of operation completely to relieve the obstruction; this point cannot be too strongly emphasized, for if the obstruction is only partially relieved, residual urine will persist and secondary infection and conges-

tion that will be most difficult to combat will result. I believe more poor results have followed the failure to remove enough tissue than ever followed complications resulting from removing too much.

Recently, McCarthy has modified his "panendoscope," which gives an unsurpassed view of the neck of the bladder, so that it can be employed satisfactorily in the removal of obstructing prostatic tissue, and Kirwin has also presented an instrument which, by first coagulating the tissue to be excised, prevents bleeding. The excision is done with a curved knife which rotates within the shaft of the instrument.

Tyvand has incorporated with the Braasch instrument the principle of first coagulating the tissue to be excised. By means of a multiple needle electrode, the path of the tubular knife through the tissue is electrocoagulated rather than the entire tissue as in the Kirwin instrument. This diminishes the bleeding appreciably, and reduces the time formerly consumed in electrocoagulating the incised surface at the end of the operation (Fig. 1).

It is frequently asked, will the relief of obstruction be permanent? The answer is, not in all cases, for every year one sees the recurrence of prostatic obstruction following previous prostatectomy, but if recurrence does take place in a minority of cases, a repetition of the procedure is in no way contraindicated and carries little risk.

It has long been observed that an enlarged prostate gland shrinks appreciably in size once the residual urine is removed by suprapubic drainage. There seems no reason to doubt that

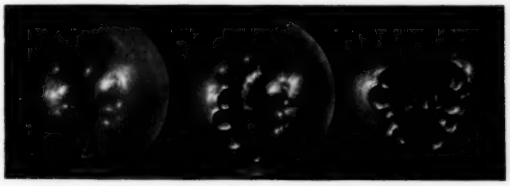

Fig. 1. Views of prostatic urethra before resection, at the time of resection, and following resection.

the same diminution in size will occur if the residual urine is relieved by some other method.

In 42 per cent of the cases of prostatic hypertrophy treated surgically at The Mayo Clinic during 1931, transurethral prostatic resection was performed. All of the patients were free of residual urine at the time of their dismissal, although many had had acute retention or had led a "catheter life" for some time previous to operation. Since January, 1926, more than 300 cases have been so treated at the clinic; the functional results compare favorably with those of prostatectomy. If residual urine can be completely relieved by a transurethral procedure, there are few patients who will part with the prostate gland to accomplish the same result.

DOUBLE UTERUS AND VAGINA WITH UNILATERAL ATRESIA*

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CONGENITAL malformations of the uterus and vagina are perhaps more common than is generally supposed. Their seeming infrequency is due, in part, to the fact that a great many produce no symptoms. And so, in these cases, unless discovered during a routine physical examination or found accidentally during an abdominal operation performed for some other lesion, they may go through life and childbearing wholly unaware of any malformation.

Again many of these anomalies prove to be real surgical problems because they are discovered accidentally by the abdominal surgeon, and just as the gynecologist may be called upon to do an intestinal resection, so the abdominal surgeon must decide what procedure, if any, should be carried out in a given malformation of the uterus. If symptoms and diagnosis are lacking preoperatively, what disturbance is likely to occur in the future?

Gynecologists differ in their opinion. Some state that double uterus causing no symptoms

*Presented as an inaugural thesis before the Minneapolis Surgical Society Dec. 3, 1931.

should be left undisturbed, while other believe that to leave a poorly developed uterus undisturbed is but to threaten the life of the woman should pregnancy occur.

Due to the wide variation of conditions encountered, each case is a law unto itself and no set rules can be formulated as to treatment.

Embryology.—The union of the right and left mullerian ducts occurs in embryos of 22 mm. to 28.5 mm. Union occurs first at the site of the future cervix uteri and advances thence in both the cranial and caudal direction.

With union completed, the portions that remain separate above are the primitive tubes. These primitive tubes consist of two portions, the upper vertical portions which are to be the Fallopian tubes, and the lower horizontal portions which are to be taken up into the uterine wall in its development.

The union of the two mullerian ducts is at first only an external one. Though forming a single external contour, in the interior each has still its own medial wall. Later the two medial walls fuse to form a septum. This septum becomes resorbed in the caudo-cranial direction, forming the utero-vaginal canal.

The formation of the wall of the utero-vaginal canal begins with a thickening of the surrounding mesenchyme. The resulting mesenchymatous wall surrounds the utero-vaginal canal and the horizontal portions of the primitive tubes. As a result the fundus uteri is formed from the horizontal portions of the tubes and the cervix uteri is formed from the utero-vaginal canal. The lumen of the uterus is thus given a triangular form.

In embryos of from 340 to 355 mm.[1] the circular muscle layers of the corpus uteri and those of the cervix fuse, and, in addition, the circular musculature of the corpus fuses with that of the tube. The two tubes meet the body of the uterus at an angle, and that produces a certain amount of confusion in the previously simple arrangement of the musculature. The inner strands of the musculature of the tubes pass directly over into the circular layer of the uterus, but the outer strands stream out as longitudinal bundles both on the ventral and on the dorsal surface of the uterus, and thus form an outer longitudinal muscle layer on the body of the uterus.

From the seventh fetal month to the end of pregnancy there is at first only an enlargement of the layers already present. In the body of the uterus the circular musculature always constitutes the principal mass. It grows in a threefold manner: (1) by an increase in the thickness of its parts; (2) by the development of new layers at the periphery; and (3) by the development of new layers between the bundles of the circular muscle. These last, the interstitial bundles, are sometimes oblique and sometimes longitudinal, and produce the felted mass of the adult uterus, whose constituent parts can scarcely be made out. The outer longitudinal bundles that stream down from the tubes become included in this confused mass.

Various degrees of failure of union of the two mullerian ducts, or an arrested development of these ducts result in the various malformations.

Different classifications of double uterus are given, including uterus bicornis bicollis, uterus bicornis unicollis, uterus septus, uterus subseptus and uterus didelphys. Uterus didelphys is the result of complete failure of union of the two mullerian ducts in those portions which normally fuse when a single uterus is formed.

In uterus didelphys we have two organs, which, from the embryology we know, are in reality but two halves of a uterus, lying apart and entirely separate externally. The medial walls of such uteri are weaker in structure.

Imperfect fusion and failure in resorption of the two medial walls of the lower portions of the two ducts results in double vagina.

In inflammations of the pelvis, septic emboli are more prone to occur in such uteri and, as Epstein and Goldberg[2] state, may be explained by the two uterine arteries not anastomosing as they do normally in front of and behind a single cervix, behaving similarly to a terminal circulation. They believe that in their case, that of a six and one-half months gravid uterus didelphys in which there was pelvic infection, resulting in streptococcic peritonitis, the necrotic right ovary may have been caused by a septic thrombus in the right uterine artery cutting off the blood supply of the ovary, since the ovary receives its blood supply mainly from the ramus ovaricus, a branch of the uterine artery.

Of the eleven cases of double uterus encountered at the Free Hospital for Women, Brookline, Mass., and reported by Puddicombe,[3] seven were of the bicornuate type, two were didelphys uteri, and two were classified under uterus planifundus septus, subseptus. Of these eleven pa-

tients, nine had abdominal operations. Three unilateral and three bilateral hysterectomies were performed. Puddicombe[3] also reports eight cases of uterus duplex from the records of the Boston Lying-In Hospital. Six of the eight were primiparæ. Of these cases, one was in labor slightly over seventeen hours and was delivered by low forceps; one had a ten hour labor and was delivered by mid forceps; one went forty-eight hours and was then delivered by cesarean section. In this case there was a beginning rupture of the uterus. Four of the remaining cases had cesarean section. One of these had a ruptured uterus at five and one-half months, having previously had four normal deliveries. The eighth case had a premature separation of the placenta and delivered herself of a seven months macerated fetus.

Abortions are common in cases of double uterus and even rupture of one horn may occur in the early months of pregnancy. Truesdale[4] reports a rupture at three and one-half months in a uterus bicornis unicollis and quotes Brugh as reporting one at two and one-half months in the same type of malformed uterus. Puddicombe[3] quotes Picot as reporting one case in which there were fourteen abortions and Gautermann as having cited a case in which three children were born from the right horn and nine abortions having occurred from the left.

Malalignment of muscle strands in such a uterus causes a lack of contractile power and a misdirection of the expulsive force resulting in dystocia and endangering rupture of the medial wall of the uterus. Epstein and Goldberg[2] point out that it is the exception for such cases to go through pregnancy and labor uneventfully. Their conclusions being to treat pregnancy in a double uterus as a nonruptured ectopic. Empty the uterus and correct the maldeveloped organ. They also state that if the condition is not discovered until the end of pregnancy, to be prepared for a severe postpartum hemorrhage, and be ready for a stormy puerperium.

Horn[5] and Caswell[6] both report a case of uterus didelphys with torsion of the pregnant right uterus at six months, bringing about such severe circulatory changes that gangrene ensued in half of the uterus.

The literature for the most part deals with the obstetric complications. While it would seem that conservatism should be urged here, more especially than in some other fields of surgery, some gynecologists have regretted that they did not sterilize the patient or remove the malformed uterus.

Utriculoplasty may be carried out with more success in the bicornuate type than in the widely separated uterus didelphys, in either type more safely if a dilatation of the upper genital tract does not exist (hematometra, hematosalpinx). In uterus didelphys with very short round ligaments and a wide pelvis, utriculoplasty would be impracticable.

In cases of double uterus and vagina with unilateral atresia a diagnosis may be very difficult. Symptoms do not develop until menstruation is established and there is an accumulation of menstrual blood in the occluded half. If one could be sure that hematosalpinx, with its thin wall and danger of rupture, did not exist, a simple plastic operation on the intervaginal septum would relieve the patient of her complaint. This operation was the only one mentioned in the earlier literature and its performance resulted in many deaths due to peritonitis.

It would seem then that exploratory laparotomy should be practised and in the didelphys uteri where utriculoplasty is impracticable one should remove the lesser developed of the two uteri or the one associated with diseased adnexa or the occluded vagina. Pregnancy occurs quite readily in these cases and the patient might still be subject to various obstetric complications. If simple sterilization without the removal of the remaining uterus seemed best, the patient would still have the benefit of the psychic effect from the retained function of menstruation, which is very important in such young individuals. Again conditions met with may be such that to remove both uteri seems the safer for the patient.

CASE REPORT

Miss M. D., fourteen years of age, was admitted to the Deaconess Hospital, January 3, 1931. She complained of pain in the rectum, and constipation. Menstruation began in April, 1929, occurred every three to five weeks, lasted three to four days, was moderate in amount and not associated with pain. Constipation developed in July, 1930, when with her menstruation she experienced a dull pain in the lower left abdomen and a feeling of pressure in the rectum as if the bowels were going to move. At stool she would strain with no result. With the August period she noticed an increase of pressure in rectum. In September the pressure symptom was more marked. She complained of

pain in the rectum and severe abdominal cramps. Taking larger doses of cathartics, she would have a small soft stool every two or three days. Between periods she was quite comfortable lying down, until the November menstruation. Since then the pain has been more severe at night, causing the patient to get out of bed and walk. Walking about slowly was more comfortable than sitting. During November and December she was unable to study or sleep because of intermittent abdominal pain. In December she noticed she was tender to pressure in the lower abdomen. The pain extended down the back of the legs and she was very nervous and irritable. There was no urinary frequency nor painful urination.

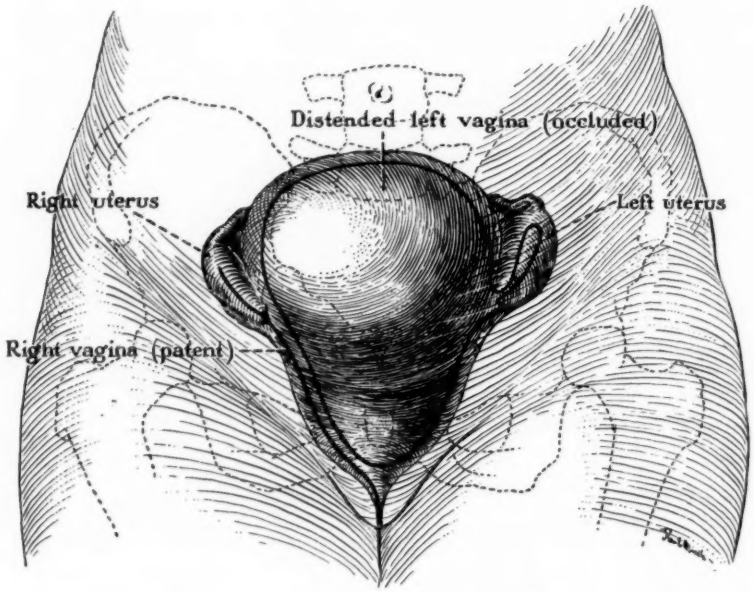

Fig. 1. Uterus didelphys and double vagina with unilateral hematocolpos and hematometra.

Laboratory Report.—The urine was normal. A vaginal smear was negative. Hemoglobin 76; r. b. c. 4,490,000; w.b.c., 9,400.

Physical Examination.—There was a marked tenseness of the lower abdominal muscles. The external genitalia were normal. Per rectum a tense mass could be palpated. Vaginal examination under gas anesthesia revealed a tense smooth cystic mass extending from the hymen to the left along the vaginal wall as high as one could palpate. The narrow vagina ascended along the right side of the pelvis and because of the tumor mass the cervix could not be reached. There was no blue discoloration. The left vaginal wall felt uniformly thickened. Per rectum a very tense smooth pelvic mass occluded the lumen. The mass extended up to just below the umbilicus. The upper border seemed smooth and no irregularity could be made out through the rather fleshy abdominal wall. This tumor mass seemed fixed, and filled the pelvis.

Though we considered hematocolpos as most probable, we also felt that we might be dealing with some cystic tumor, as perhaps a cyst of Gartner's duct.

Operation.—On January 5, through a median incision we found that the upper smooth convex border of our tumor mass was the distended left vagina whose surface contained many blood vessels. To the right side of the distended left vagina was the long narrow right vagina and at its summit but almost at right angles to it was the right uterus. The left uterus was lying on the opposite side of the false pelvis in the same relative position. The left uterus was the larger and softer of the two. Each uterus had a tube and ovary attached. The round ligaments were drawn up taut to the ascended uteri and though stretched were not over 5 cm. in length. The enlarged and cystic right ovary was resected. The left ovary was normal. Upon deciding to remove both uteri and the upper portion of the left vagina, an incision was made in the dome of the tumor mass (the left vagina), and between two and three pints of a dark reddish black material of gelatinous consistency was removed.

Bilateral hysterectomy and salpingectomy with an amputation of the upper portion of the left vagina was completed, leaving a gauze pack in the left vagina. The abdomen was closed, the patient was placed in the lithotomy position and an incision made in the intervaginal septum. The gauze pack was pulled partly through the incision. This gauze drain was removed

in forty-eight hours. The left uterus contained one ounce of old blood.

Upon examination September 12, 1931, the right vagina was found to be of normal depth, well supported and situated medially in the pelvis. The opening in the intervaginal partition had contracted down to about one inch in diameter.

Note: Discussion of this article appeared in the Proceedings of the Minneapolis Surgical Society in Minnesota Medicine, February, 1932.

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NORMAN BAKER VS. THE AMERICAN MEDICAL ASSOCIATION

Norman Baker of Muscatine, Iowa, who headed a number of mercantile enterprises, including the ownership of a radio broadcasting station and an alleged cancer cure, was dealt with, editorially, in the Journal A. M. A. of April 12 and April 19, 1930, and in *Hygeia* for May, 1930. As a result of these publications, Baker brought suit for libel against the American Medical Association, asking one-half million dollars in damages. This case came to trial in the federal district court in Davenport, Iowa; the trial opened on February 9 and continued until March 3, covering a period of nearly four weeks. On March 3, the jury returned a verdict for the American Medical Association. Baker had two (and, for a short time, three) alleged treatments for cancer that were being given at Muscatine in the building that was known as the "Baker Hospital." They were (1) a treatment for "external" cancer, an arsenic powder exploited by Harry M. Hoxsey, and (2) the injection treatment for "internal" cancers of one Charles O. Ozias of Kansas City. Baker broadcast over his radio station that he was going to investigate a cure for cancer (the Ozias "treatment") and that he wanted five men or women from any part of the United States or Canada who were suffering from cancer to consent to become a test patient for this treatment. These "test cases" were widely advertised by Baker. Here it may be interpolated that all five of the patients were dead for some time before Baker ceased advertising that "Cancer Is Conquered." Before closing its case, the American Medical Association put in evidence between twenty-five and thirty death certificates of patients who died at the Baker Institute. The Association also submitted seventeen death certificates of Hoxsey victims. During the course of the trial it was brought out that the State of Iowa had enjoined Baker from practicing medicine without a license and that the Federal Radio Commission had revoked Baker's broadcasting license, because it found that his operation of the station was inimical to the public interests. (Jour. A. M. A., March 19, 1932, p. 1012.)

PRESIDENT'S LETTER

THE United States is the largest modern nation without compulsory insurance. The essential feature of health insurance is the collection of a large number of small contributions from any employees, employers, and sometimes from the whole community through taxation, and the expenditure of the fund thus accumulated in meeting the individual emergencies due to sickness of those covered by the insurance scheme. Health, or sickness insurance (interchangeable terms) is a human problem, an effort to meet and care for the ills to which flesh is heir, and to remove as much as possible of the social, economic, and physical burden of that heritage.

Three main sources of information concerning such insurance are available in the literature, in which attitudes are rather sharply defined. A fourth source may share one of the angles presented by the other three. The first source is the official governmental reports, prepared by the officials who have charge of the governmental phase of the insurance system in question. Such officials are naturally swayed by political forces and are not likely to be sharply critical of their own work or of their departments. The second source is the reports of insurance funds or societies. These more or less independent organizations conduct most of the financial phases of insurance under some sort of governmental supervision. The huge funds are disbursed through three channels: cash payments during invalidism, fees for medical services, and payments for pharmaceutical supplies. Members of the medical profession issue certificates of invalidism, receive fees directly, and write the prescriptions. That is, the expenditures are largely determined by almost independent individuals, or organizations, such as the medical profession. This anomalous and peculiar situation explains many of the difficulties that arise. The third source is the publications of the medical profession. The insurance societies are prone to exaggerate the amounts paid for medical service, so it is only natural that the medical profession should respond by seeking to prove underpayment. The constant overemphasis on the financial side renders any scientific discussion very difficult. A fourth source of information is furnished by the elaborate and valuable studies of the International Labor Office. This office is by no means an impartial observer. It has been instructed by an overwhelming majority of its constituent nations actively to propagandize for compulsory health insurance.

The foregoing data are taken direct from the introduction to "The way of health insurance" by A. M. Simons and Nathan Sinai of the research staff of the Committee on the Study of Dental Practice of the American Dental Association. The medical profession of America owes these men and the Dental Association thanks, for this small volume is very timely. The introduction is clear cut and paves the way for the details that follow in the book. The authors proceed to point out the salient points in the systems of Great Britain, Germany, France, Denmark, Sweden, Norway, Austria, Hungary, and other countries. In the June issue of MINNESOTA MEDICINE a fuller and more interesting review is given than I can give here. This book* should be read by every member of our State Association and should be readily available for reference. I believe that every component society of our Association would do well to circulate one or more copies among its members. A sound understanding of the principles of health insurance will fulfill the old adage that "forewarned is forearmed," when these matters are brought up for consideration in our various legislative assemblies, as they surely will be.

W. A. Henderson.

President,
Minnesota State Medical Association.

*This volume may be obtained direct from the University of Chicago Press or by sending the price, $2.00, to the business office of MINNESOTA MEDICINE.

EDITORIAL

MINNESOTA MEDICINE

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ABUSES IN MEDICATION

The Interprofessional Relations Committee consisting of representatives of the druggists, dentists and physicians in Minnesota, is carrying on a commendable publicity campaign in the interest of economy in prescribing.

A variety of remedies has been developed in recent years by various pharmaceutical houses, possessing in many instances real therapeutic value, and put on the market under trade names. These remedies have been advertised to the profession and a real service to patient and physician has been rendered.

The fact remains that these remedies now appear in the Pharmacopœa and New and Nonofficial Remedies under their drug names and cost the druggist one-half to one-tenth as much as the same drug with the trade name. The average physician has learned the drug by its trade name and has not made the effort to learn the official title, this omission being an expensive proposition for the patient. When a prescription uses the trade name of a drug, the conscientious druggist must dispense the more expensive preparation, even though it is identical with the official preparation.

Calling the attention of the profession to the situation should result in a real reduction in the cost of medication, which is admittedly too high. It would be well for hospital superintendents or medical staffs to authorize hospital pharmacists to dispense the official drugs on all occasions in the interest of economy.

The druggist is interested as well. It is true that it is economy for him to purchase certain preparations rather than to take the time to make them up himself. But when a physician writes an expensive prescription, unknowingly very often, the druggist cannot add his usual percentage and make the sale. On the other hand the fact should not be lost sight of that the writing of the less expensive official drug offers the temptation to the druggist to make an extra profit at the expense of the patient who knows nothing about the comparative wholesale cost of preparations.

Another unwise practice on the part of physicians is the indiscriminate passing on to patients of pharmaceutical samples. Some are standard preparations and there is no more point in concealing their labels than in writing a prescription in Latin. Some of the samples, however, are patent medicines of unknown composition, and it is needless to say should never be dispensed. Some are drugs under trade names and dispensing these without removing the label simply serves to advertise an unnecessarily expensive remedy. Soon the preparation may be advertised directly to the public with the statement that it has been widely used by the profession. Thus the profession is unwittingly used to further selling the public directly and encourages self medication.

Another practice which furthers self medication is the writing of "original bottle" on a prescription. Too often the original bottle facilitates the purchase of addition bottles for neighbors and friends.

We all know there is a tremendous waste in the money spent for medicines in this country.

The Committee on the Costs of Medical Care has determined that the huge sum of $715,000,000, which is 20 per cent of the national bill for sickness, is spent annually in this country for medicine. Only a fourth of this represents physicians' prescriptions (part of which, of course, are useless). Another fourth represents non-secret home remedies purchased by the public direct. Half of the total is the bill paid by the nation for patent medicines of secret composition.

From this it is perfectly apparent that there is entirely too much self medication going on. Much of it is probably simply a waste and harmless. The druggists tell us, however, that certain drugs are being bought over the counter in this state which are not devoid of danger if used indiscriminately. Some states have extended the list of medicines obtainable only on physicians' prescriptions, and there is good reason to believe that Minnesota should follow suit.

STATE MEETING OF 1932

Those who attended the seventy-ninth meeting of the Minnesota State Medical Association which met in Saint Paul in May must have been impressed with the unusually fine program and the extended scope of the scientific exhibits. Expressions of interest and enthusiasm on the part of the large number of visitors from other states indicate that the Minnesota meeting is taking a place in the fore-rank among state medical meetings in America. The program committee is to be congratulated.

Some 1,030 physicians registered—a record for our state meeting. Additional registrations to the number of 694 included internes, medical students, nurses, exhibitors and members of the Women's Auxiliary.

The gold medal presented each year by the Southern Minnesota Medical Association for the best scientific exhibit was awarded this year to Dr. L. A. Buie of Rochester for his exhibit entitled "Proctology: Diagnostic and Surgical."

An innovation in this year's program was the arrangement of small group demonstrations which were held Tuesday and Wednesday mornings. The attendance at these group meetings demonstrated their popularity and they will probably be further developed at our future meetings. The same may be said of the scientific cinema.

Dr. N. O. Pearce of Minneapolis, who has been so active in association affairs for many years, was elected president for 1933. William A. Piper, Mountain Lake, was elected first vice president; F. R. Huxley, Faribault, second vice president; E. A. Meyerding, Saint Paul, secretary (re-elected), and W. H. Condit, Minneapolis, treasurer (re-elected).

Dr. J. M. Hayes of Minneapolis was elected to fill out the unexpired term of Dr. Pearce as councilor of the second district and Dr. H. Z. Giffin of Rochester was re-elected councilor of the first district.

THE MINNESOTA CANCER SURVEY

There is no question in the entire field of medicine now receiving the attention given to cancer, its diagnosis, treatment and care. Enough is now known to point the way to the development of better methods of treatment and care.

Cancer is the outstanding challenge to the medical profession today. Its constantly mounting mortality, its discovery in younger and younger age groups, and its widespread distribution make it most important to know as definitely as possible all factors bearing on the disease. From past experience it is realized that these factors are not of universal application but vary for each community. For this reason a standardized program of cancer control cannot be formulated but must be built around the factors controlling the situation in a given locality or state.

The Minnesota State Medical Association has long been interested in cancer and this interest has culminated in an invitation to the American Society for the Control of Cancer to make a state-wide survey of this disease, reporting its findings with recommendations to the medical society for its guidance in the development of an improved program of cancer service in this state. The Cancer Society accepted the invitation for the survey, which will be made without expense to the medical association, and Dr. F. L. Rector, Field Representative for the central district in which Minnesota is located, will begin the field work in the very near future.

It will be necessary for the hospitals of Minnesota to furnish certain information and for this purpose a short questionnaire will be sent to each hospital of about fifty beds and over asking for certain facts including a minimum of statistical data. Dr. Rector plans to visit most of these hospitals in order to discuss the problem with hospital authorities and staff members. Hospitals can render a distinct service by supplying the requested information at the earliest possible date.

This survey is a *fact finding undertaking.* The report will discuss the findings, and the recommendations will be based on the analysis of the collected material. The field work will require several weeks for its completion. The objective always kept in view is the development of a better service to the cancer patient and a better understanding of this problem by the medical profession. The control of cancer belongs to the profession and the report of this survey will carry a suggested program in which the medical profession will have a major part, the details of which will be developed as the work progresses.

Please keep this survey in mind, and when Dr. Rector calls on you for assistance be as helpful

as you can, remembering that this survey is undertaken at your request as a member of your own medical association. This report, developed by an unbiased national organization constantly studying this problem in all parts of the country, should prove of great value to the physicians of Minnesota. It will be awaited with interest.

Dr. Harold E. Robertson, Rochester; Dr. J. C. Litzenberg, Minneapolis; Dr. John L. Rothrock, St. Paul, and Dr. Arthur N. Collins, Duluth, have been appointed a special committee to coöperate with Dr. Rector in the survey and receive his report.

W. A. O'B.

OF GENERAL INTEREST

Dr. E. O. Voyer, Minneapolis, sailed June 22 from New York for Europe where he will attend clinics in Paris and Vienna and the British and Canadian medical convention in London. Dr. Voyer will return about the first of September.

Dr. Thomas K. Moen, Minneapolis, has been appointed to the staff of the Rockefeller Institute in New York City. Dr. Moen will be engaged in the investigation of acute rheumatic fever, with Dr. Homer Swift. For the last three years he has been assistant in the University Hospital, Minneapolis. He will leave for New York in September.

Dr. Edward C. Emerson of Saint Paul was recently elected secretary of the American Medical Association chapter in Budapest. Dr. Emerson left last March to study in the clinic of Dr. Polya, noted European surgeon. Following the attendance of other clinics in Vienna, Paris and London, Dr. Emerson will return to Saint Paul some time this month.

Dr. and Mrs. B. O. Mork and son Raymond of Worthington, Minnesota, sailed in June for Europe where they will spend about two and one-half months. They plan to visit Berlin, taking a trip on the Rhine River and will spend some time in Hamburg, Copenhagen, Stockholm, and Aalesund on the west coast of Norway, the home of relatives of Dr. Mork. On their return home they will visit London, Oxford, and other places of interest.

Dr. H. E. Chamberlain, director of the Minneapolis Child Guidance Clinic at Lymanhurst Hospital, Minneapolis, has resigned his position effective September 1. Dr. Chamberlain has accepted the position of associate professor of psychiatry at the University of Chicago. He will spend the month of July at Smith College, where he will serve as instructor in social psychiatry in a summer school for social work.

Nominations are in order for the fourth award of the Saunders Medal, bestowed annually on the American nurse chosen for having "made to the profession or to the public some outstanding contribution either in personal service or in the discovery of some nursing technic that may be to the advantage of the patient or the profession. The only kind of service excluded is that of writing." Names with a description of the accomplishments of the candidate may be submitted either directly or through a state association of nurses to the national headquarters of the American Nurses' Association, 450 Seventh Avenue, New York.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

ST. PAUL NATUROPATH PLEADS GUILTY

State of Minnesota *vs.* Herman C. Frerichs

On June 2, 1932, Judge Carlton F. McNally, of the District Court of Ramsey County, sentenced Herman C. Frerichs, fifty-two years of age, who claimed to be a naturopathic physician, to pay a fine of $100.00 or serve thirty days in the Workhouse for practicing healing without a Basic Science Certificate; Frerichs paid the fine.

Frerichs maintained an office in his home at 601 Dayton Ave., St. Paul, Minn., for the purpose of practicing naturopathy. He had considerable equipment for the giving of light ray and diathermy treatments. Frerichs claims to be a graduate of Heidelberg, but apparently is unable to produce his diploma or other credentials. In 1927 Frerichs obtained a massage license from the old Massage Board but voluntarily surrendered it in 1929 when the masseurs were placed under the regulations of the State Board of Medical Examiners.

Following his arrest on April 12, 1932, Frerichs removed the signs from the front of his home and was instructed by Judge McNally to remove his listings from the telephone directory and the city directory. He was also warned by the Court against attempting to practice healing in the future until he was properly licensed. Frerichs claims to have been engaged in the healing art for the past twenty-one years; his activities were first called to the attention of the Medical Board early in 1930, and following an investigation Frerichs agreed in writing to refrain from practicing healing in the future. His failure to comply with this agreement resulted in his arrest.

Splendid coöperation was received in the prosecution of this case by the State Board of Medical Examiners from the St. Paul Police Department under Chief Brown, in addition to the splendid attitude displayed by the staff of M. F. Kinkead, County Attorney. This is the first case instituted by the Medical Board to come before Judge McNally for disposition and the warning given by the Court to Frerichs, as well as the sentence imposed, indicates a desire on the part of Judge McNally fairly and firmly to enforce the provisions of the Basic Science Law.

OBITUARY

Dr. John Wesley Andrews

1849-1932

Dr. J. W. Andrews passed away at his home in Mankato on May 16, 1932, at the age of eighty-three years. He was well known to members of the State Medical Association, having been active in association affairs during his fifty-five years of medical practice, forty-seven of which were spent in Mankato.

Born in Lawrence County, Illinois, April 6, 1849, the son of a Methodist minister, he came to Saint Peter in the fall of 1856. After attending the local public schools, Dr. Andrews attended the old Normal School at Mankato in 1868, where he contracted typhoid fever. After teaching three years in the high school at Saint Peter, he began the study of medicine, attending lectures at Michigan University for a while and graduating from Rush Medical School in 1877.

On April 4, 1878, Dr. Andrews married Miss Jennie French at Marshall, Minnesota. Mrs. Andrews passed away in 1923.

Returning to Minnesota, Dr. Andrews practiced for three years at Marshall before locating in Mankato. In 1886 he studied in Berlin and Vienna.

Dr. Andrews and his son, Dr. Roy Andrews, were charter members of the Mankato Clinic which was organized in 1916. Although not in active practice

since 1923, Dr. Andrews maintained an office in the clinic.

Dr. Andrews was recognized for his surgical ability and was a member of the American College of Surgeons. He was at one time president of the Minnesota Valley Medical Association and of our State Association. His varied activities are evidenced by his having been at one time president of the Mankato Board of Trade, forerunner of the present Chamber of Commerce, president of the board of directors of the Y. M. C. A., and a director of the First National Bank. He was also an active Mason.

In April, 1907, Dr. Andrews was elected Mayor of Mankato and from 1914 until 1918 served as state senator for Blue Earth County. His activities in community affairs continued even in his later years, and from 1929 to 1931 he was a member of the Mankato Board of Education, serving as president in 1930 and 1931.

In late years Dr. Andrews traveled extensively. He visited Panama and the West Indies and in 1923 joined the cruise to South America with the American College of Surgeons. In 1925 he took the Mediterranean trip.

Dr. Andrews is survived by four brothers and sisters, one son, Dr. Roy Andrews, of Mankato, and one granddaughter.

Dr. James Franklin Kline

1862-1932

Dr. James Franklin Kline, 70, founder of Kline's sanitarium at Anoka, died May 19, 1932, at his home in Anoka, after a two weeks' illness. He had been a resident of Anoka for thirty-nine years.

Born in Richville, Pa., January 4, 1862, Dr. Kline attended the public schools of Pennsylvania, and was graduated from the Bryant and Stratton business college in Cleveland in 1879. During the school year 1884-85 he took a special business course in Minneapolis.

He was graduated from the college of medicine at the University of Minnesota in 1893. He came to Anoka soon afterward.

For several years he was surgeon for the Great Northern railroad. He was a member of the Royal Neighbors, Royal Arcanum, Woodmen, Workmen and Degree of Honor.

He was married September 15, 1888, to Miss Anna Griffith. He is survived by his wife; two daughters, Mrs. Harland Cushman, Yonkers, N. Y., and Mrs. Fred Meyer, Anoka; two sons, Franklin J. Kline, Minneapolis, and Dr. Harry Kline, Anoka, who was associated with him at the sanitarium; and a brother, Charles Kline, Columbus, Ohio.

Dr. W. F. Cobb

1847-1932

Dr. W. F. Cobb, pioneer physician in Mower County, Minnesota, died at his home in Lyle early in June, 1932. Dr. Cobb was born in Maine June 14, 1847, making him within a few days of eighty-five years old at the time of his death.

The Cobb family moved from Maine to Wisconsin before coming to Iowa. For a number of years the family lived at Mona, a village one mile south of Lyle. Dr. Cobb received the usual preliminary education of those early days and then entered the University of Wisconsin in 1865, graduating in 1870. In the fall of that year he entered the Chicago Medical College and was graduated in 1874. He then returned to Nona and started his practice, remaining there until 1895, when he moved to Lyle.

On April 30, 1871, Dr. Cobb married Abbie C. Mason of Rutland, Wis., and to this union were born four children: Edith A., Edna M., Ethel M., and Enid H., two of whom survive, Edna, Mrs. N. C. Putman of Lyle, and Edith, now Mrs. L. O. Olson, of Northfield. together with his wife.

Dr. Cobb, during the greater part of his life, took an active part in the official and private life of Mower County and attained an enviable position among the medical fraternity of this portion of the state. He was a member of the American, Minnesota State, Mower County and Mitchell County Medical Associations, having served as president of the Mower County unit and treasurer of the Mitchell County organization.

For six years Dr. Cobb was mayor of Lyle. He also served as president of the school board there, president of the Lyle Telephone Company and was local surgeon at Lyle for the Illinois Central Railroad Company, as well as for numerous insurance companies and fraternal orders. In politics he was a Republican. He was a life-long member of the Congregational Church. He was a high degree Mason and a member of various other fraternal orders.

MISCELLANEOUS

SOCIAL INSURANCE

EDWARD H. OCHSNER, M.D.
Chicago

QUALITY OF MEDICAL SERVICES DETERIORATES UNDER COMPULSORY HEALTH INSURANCE *(continued)*

Some fifteen years ago when the prices of eggs and chicken feed were at their highest, I wrote my farmer and asked him why he was not sending us any eggs. I received the following laconic answer: "The pullets look good but lay no eggs." Superficially examined, Compulsory Health Insurance "looks good" but unlike my pullets it has laid many eggs, most of which are addled.

When we substitute governmental control in medicine and dentistry for independent individual action, we stifle self-expression, individuality, initiative, courage, confidence, enthusiasm, and industry. We, as a nation, are on the whole already over-standardized. The very ones who wail the loudest about the evils of mechanization are often the very ones who clamor the most for more government control. Excessive bureaucratic and lay control have much the same spiritual effect upon the professional man as over-mechanization has upon the intelligent craftsman. They both have a tendency to crush out fortitude, ingenuity, and pride of achievement in those engaged in these vocations. With some, standardization has become almost a fetish in spite of the fact that when pushed too far it always results in mediocrity. The efficient successful practice of medicine always has been and always will be a personal unstandardized affair.

That the quality of medical services has deteriorated in those countries which have Compulsory Health Insurance is due to many causes, among which may be mentioned the excessive number of calls upon the time and energy of the physician. Those who receive free medical services are constantly running to the physician for every trifling ailment or compelling the physician to make many unnecessary calls at the homes. Every Krankenkasse physician who has been interviewed has stressed this fact. Baeumer states in his book that between sixty-five and seventy per cent of all calls are unnecessary, consume the time and eneregy of the physician and the resources of the Krankenkasse, and prevent adequate medical services and hospital care to the really sick. Liek in his book says the number of trivial conditions such as "microscopic skin abrasions, etc.," disgusted him so much that he retired from the service. This abuse has grown to such proportions in Germany that the government department has been compelled to issue new regulations to the effect that the insured have to pay a certain fee out of their own pockets for each prescription. This again has given rise to new abuses. A common sequence of new regulations to correct one abuse is to create an opportunity for newer ones. In England unnecessary night calls

became so common that many panel physicians disconnected their phones between ten o'clock P. M. and seven o'clock A. M. A fine state of affairs if a patient has a strangulated hernia or an attack of gall stones or acute appendicitis at midnight! We have all repeatedly seen and heard the statement that the workers of this country do not have medical services when they most need them—namely, at the beginning of an illness. The claim is made that were prompt services available at this time much serious illness could be avoided. Conclusive proof that private practice is more prompt than Compulsory Health Insurance practice is evidenced by the practice in England of avoiding night calls, and by the fact that the percentage of pus appendix cases, which necessitate draining, is much greater in Germany than in the United States. We all know how the mortality rate is increased by letting acute appendix cases progress to suppuration before they are operated and how much longer the period of hospitalization is in suppurative cases. If acute illnesses had more prompt and more efficient treatment in Germany, for instance, than in the United States, suppurative appendix cases should be much less frequent, the mortality rate should be lower and the morbidity shortened. As a matter of fact, the reverse is the case, which proves rather conclusively that medical services in the United States are more efficient than those in Germany. Such abuses result in endless rules and regulations—rules that accomplish little except to cramp the individuality and personality of the conscientious physician, wear him out with paper work and leave little time and energy for professional study and advancement. One official described his plight in the following words:

"I've settled into official routine; I'm fixed there hard and fast. It's so with many of us. Most of us recognize the hopelessness of ever pulling out. As I sometimes confess, I am merely one of the unburied dead."

That Compulsory Health Insurance does not in fact prevent sickness nor reduce economic loss as the result of sickness is also proven by the following facts. Before the World War the average loss of time for sickness of the American laboring man was six and two-tenths (6.2) days per year; the German's, nine and two-tenths (9.2) days; the Austrian's, nine and five-tenths (9.5). We are credibly informed that since 1923 the loss of time in Germany has increased another eighty per cent above the nine and two-tenths (9.2) so that it now stands at approximately sixteen and five-tenths (16.5) as against six and two-tenths (6.2) in America. A fine showing for Compulsory Health Insurance after forty-eight years of operation!

Let us see what some of the German and English think about the scheme. A high salaried German health insurance official said the following in 1927: "Health insurance is the oldest branch of German Social Insurance. The sickness insurance law of June 15, 1883, was the cornerstone of the proud building for which we were envied by foreign nations before the war. Unemployment insurance will, I hope in the near future, be the capstone of the building." To which Edwin Liek, a practicing physician of Danzig, makes the following retort: "This is an expression familiar to physicians, words that we have frequently heard during the past four decades. Only now they affect us differently. In the beginning the doctors believed these dulcet tones; today only *parasitic physicians* or *pure fools* join in this festive song." And again he says, "Social insurance is today organized to fill the feed trough of *bureaucratic drones.*" At a recent meeting of the Trade Union Council in Nottingham, England, a resolution was passed unanimously demanding that the Government overhaul the Department of National Health.

That the average American citizen is getting better medical services than are the citizens of those countries which have had Compulsory Health Insurance the longest is borne out by the cited statistics, the quoted opinions as well as by a rather extensive personal experience both in this country and in Central Europe.

(The next two articles will show how Social Insurance undermines national character.)

REPORTS AND ANNOUNCEMENTS *of* SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

SPEAKER: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of July will be as follows:

July 6—Management of Heart Disease.
July 13—Vitamin "A."
July 20—Purpose of Vacations.
July 27—Cancer of the Mouth.

AMERICAN BOARD FOR OPHTHALMIC EXAMINATIONS

The American Board for Ophthalmic Examinations will hold an examination in Montreal on Monday, September 19, 1932, at the time of the meeting of the American Academy of Ophthalmology and Otolaryngology.

Necessary applications for this examination can be procured from the Secretary, Dr. William H. Wilder, 122 South Michigan Avenue, and should be sent to him at least sixty days before the date of the examination.

MINNESOTA STATE HOSPITAL ASSOCIATION

At the recent meeting of the Minnesota State Hospital Association held in Saint Paul the following officers were elected for the coming year: President-elect, J. G. Norby, superintendent of Fairview Hospital, Minneapolis; president, James McNee, superintendent of St. Luke's Hospital, Duluth; first vice president, Dr. Charles Remy, superintendent of Minneapolis General Hospital; second vice president, Sister Patricia of St. Mary's Hospital, Duluth; secretary-treasurer, A. N. Calvin, Midway Hospital, Saint Paul.

PROCEEDINGS MINNESOTA ACADEMY OF MEDICINE

Meeting of April 13, 1932

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, April 13, 1932. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the President, Dr. J. C. Litzenberg.

There were forty-seven members and two visitors present.

Minutes of the March meeting were read and approved.

The President announced that the Executive Committee decided to have the May meeting on the third Wednesday of the month, May 18th, on account of the regular date conflicting with the A.M.A. meeting in New Orleans.

The scientific program of the evening was as follows:

DR. JOHN F. NOBLE (St. Paul) read his Inaugural

(Continued on page 503)

« A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION »

Early in the negotiations between the special committees of the American Medical Association and of the American Legion, the Administrator of Veterans' Affairs suggested that physicians who asked for substitution of civilian hospitals for use of veterans in place of further government hospital building were putting themselves in an untenable position.

He suggested that the physicians would do much better to join in an attempt to repeal the section of the law that permits government hospitalization for non-service connected injuries of ex-service men.

In making that suggestion the administrator was disregarding the fact that the American Medical Association had already indicated its disapproval of section 202.10 and was proceeding with its present program only because it was convinced that once such a benefit was bestowed and in operation it could not be cancelled. No benefit was ever yet taken away from war veterans, once it was conferred.

That the physicians are justified in their attitude is indicated in the failure of the sections related to veterans in the economy bill which recently passed Congress. The bill as submitted would have eliminated hospitalization for non-service connected disabilities as well as many other benefits with an estimated saving to the government, in this time of need, of some 50 millions of dollars. As it emerged, veterans' benefits remained as they were with the exception of a few restrictions with regard to emergency officers' retirement pay.

The principle of the government's obligation to take care of the sick soldier, whether his injury was of war origin or not, is firmly intrenched and all but impossible of reversal. Probably considerations of economy will never be able to dislodge the principle. They may, however, modify its application to permit the use of civilian medical and hospital facilities for some classes of veterans' cases to replace further building of expensive government hospitals.

A widespread discussion of the lavish scale on which the government has cared for veterans has accompanied the attempt to force reductions of these expenditures through the economy bill. The need for some check in the government hospital systems has become obvious to a great many people, not heretofore concerned. The outcome will not be repeal of 202.10. But it may be a serious consideration of the plan to use the non-federal hospitals as proposed by the Minnesota Legion, endorsed by the American Hospital Association and in principle agreed to by the American Medical Association as an indispensable part of any plan for the best care of acute medical and surgical conditions in veterans.

(Continued from page 501)

Thesis entitled "The Relationship of Hepatitis to Cholecystitis."

DISCUSSION

DR. O. H. WANGENSTEEN (by invitation): I believe clinicians generally will welcome this study of Dr. Noble. It is my impression that it is the best approach to the solution of the problem. Too often the hepatitis has served the surgeon as an explanation for unhappy results following surgery upon the biliary tract. It is rather unusual and perhaps not without significance that pathologists, who are undoubtedly quite conversant with most of the pathological disturbances that affect the liver, should have taken no cognizance of the predicated relationship between cholecystitis and hepatitis.

I would infer from Dr. Noble's study that there is an even higher degree of correlation between the age factor and hepatitis than exists between cholecystitis and hepatitis. It is a remarkable fact that these changes in the liver are observed almost entirely on the superior surface, and only very rarely on the inferior surface where the liver comes in contact with other viscera. Some six or seven years ago I undertook the study of the alleged relationship between cholecystitis and hepatitis experimentally. It was found that when acute infections were established in the gallbladder of the dog, attendant microscopic findings were almost uniformly found in the liver. The greater number of these animals died, however, of peritonitis and other effects of sepsis. Success was finally achieved in establishing a chronic cholecystitis in the gallbladder of the dog by placing gauze, agar, and attenuated culture of streptococcus in the gallbladder. In no instance in 18 animals in which chronic cholecystitis was established in the gallbladder did an interstitial hepatitis develop. Incidentally, when human gall stones were placed in the dog's gallbladder, they dissolved rather quickly and no trace of calculi remained. Dr. Ivy has since elaborated some interesting facts from a similar observation made in his laboratory.

Pathologists recognize both parenchymatous and interstitial changes in the liver. These effects in the liver which surgeons have referred to as hepatitis of gallbladder disease, pathologists would probably describe as not being unusual microscopic findings in the liver. The gross changes that the surgeon sees at operation are undoubtedly only involutional changes in the capsule—a perihepatitis.

One cannot escape the impression that pathologists are too lenient with surgeons in the diagnosis of cholecystitis upon removed specimens. Even the gall bladders of newborns show pericholecystitis.

It is not an uncommon thing in medicine that our knowledge of therapeutic agents of relief comes before the causes of the disease are ferreted out. To this, gallbladder disease is no exception. The manner in which the gallbladder becomes diseased is still not fully clarified. Naunyn said that all gall stones were the result of infection. Aschoff and Bacmeister later excepted the cholesterin stone. Today we admit that a large number of gall stones are not the result of infection. Stasis in the gallbladder has been blamed as the exciting factor in cholecystitis and cholelithiasis. Still Boyden found that the gallbladders of women (in whom gallbladder disease is two or three times more common than in men) empty more rapidly than the gallbladders of men. Gall stones appear to be as common, statistically, in unmarried as in married women of the same age. Much remains to be found out concerning the genesis of gallbladder disease.

I feel that this study of Dr. Noble is very much worth while and should deal a death blow to the opinion that these scars observed on the liver have any special pathological significance as related to the absence or presence of disease in the gallbladder.

DR. F. R. WRIGHT (Minneapolis): It seems strange to me that a man who has done as much careful study as Dr. Noble has should overlook entirely in his essay the condition of the common duct. It is well known that the best way to cure inflammatory diseases of any organ is to establish drainage. The reason we have infections of the kidney is that proper drainage is interfered with.

In 1913 a man from Boston came out here and startled the medical profession by telling them that the bladder was not as easily infected as had formerly been taught. This is true, and has been taught at the University of Minnesota for thirty years, that the bladder was not easily infected unless drainage was interfered with (circulation interfered with).

I can see no reason why, if we have good drainage of the gallbaldder, the infection should not entirely recover. The gallbladder is a reservoir; bile from the liver comes down and is stored up in it. If there is free drainage into the intestine there should be no long-continued infection.

In this study there is no mention of the common duct apparently. If the common duct is normal the gallbladder should have perfect drainage and get well.

DR. A. T. MANN (Minneapolis): I can't quite see yet why what we see at operations is not so, i.e., why the changes in the liver which are confined to the areas centering about the chronic gallbladder in such a marked way are not closely connected with the chronic inflammation in the gallbladder. The marked changes are always in the area centering about the gallbladder. Of course, these changes may occur sometimes in a liver which may show the wide-spread fine markings of a cirrhosis scattered pretty well throughout the whole liver, but I am not talking about that. I am talking about the definite markings located in the area about the gallbladder, and which are of a distinctly higher grade.

At one time I collected some fifty-seven cases, most of which were below forty years of age, and practically every one of these cases showed markings on the liver in the region of the gallbladder. We graded them in four grades. In the first grade were those in which we could see the yellowish-white spots of connective tissue in the liver, more or less confined to the gallbladder area. They usually radiated from the gallbladder margin of the liver. In the second grade there were real fan-shaped streaks in the liver, more dense near the gallbladder margin, with only little streaks and spots for a few inches, but the gallbladder was fastened more strongly to the liver than normal. In the third grade, this chronic inflammation in the liver had gone on to such a degree that the liver showed small spindles of liver tissue sticking up between these definite scars, fan-shaped again. And in our fourth grade I found two cases in which there was a half-moon of the liver that had apparently all gone and which looked like leather, yellowish-white and wet. These were all cases which had suffered for some time and in which the diagnosis had been studied sometimes by our group, and sometimes by two or three successive groups before they came to our group. They were all very thoroughly studied. They had definite symptoms and definite disability. It seems to me there must be in some of these cases an infection from the gallbladder going toward the liver.

Until it can be shown that there is some definite cause, other than the chronic gallbladder inflammation for the grouping of these markings about the gallbladder area, I feel strongly that it does not answer at all to make any general theoretical statement about changes in the connective tissue of a wide-spread cirrhotic condition in the liver.

I was very much interested in the younger ages in which we found these gallbladders. We had one gallbladder in a patient under 25 years of age. I do not recall exactly, for these were studied about 10 years ago. We divided them into 5-year periods, between 25 and 30, between 30 and 35, and between 35 and 40, and we had nearly as many between 30 and 35 as we had be-

tween 35 and 40. The only way we could figure out the initial cause in the etiology was very indefinite, but we took all the past diseases these patients had had and the nearest conclusions we could arrive at were that the gallbladder disease starts a good many years before we think it does, and it starts long before stones form. The nearest we could get was that the childhood infections of scarlet fever, sore throat, etc., were probable determining factors.

It seems to me there must be a definite group in which there is a definite infection from a chronic cholecystitis to the liver.

DR. J. A. JOHNSON (Minneapolis): I appreciate very much the splendid work and presentation by Dr. Noble. From a clinical standpoint, I have never been able to hold gallbladder lesions responsible for much permanent liver damage. When one stops to consider all the toxins that are taken into the intestinal tract and pass through the portal circulation into the liver, it is not surprising that many changes take place in that organ. It is, undoubtedly, through this source that major damages occur. It is very common to find a normal gallbladder with extensive liver changes. I feel, therefore, that we should be very careful about blaming the gallbladder too much for what happens to the liver.

DR. NOBLE (in closing): I want to thank Dr. Wangensteen for his discussion. It was largely because of his stimulus and suggestions that this work was started. He was interested to know whether or not the hepatitis described by Graham was significant. I consented in 1926 to attempt this study. The material was collected from the autopsy service at the Ancker Hospital in 1928 and 1929 but was not worked up until 1931.

I want to make myself clear with reference to the findings in the gallbladders of the newborn. The leukocytes found here must be considered normal. They are not the result of inflammatory stimulus but must be interpreted simply as wandering cells lodged in the tissue spaces.

With reference to Dr. Wright's criticism, I want to say that, although the fact was not mentioned, the common and cystic bile ducts in all of the cases described were studied grossly and all were found to be patent. In none of the cases was there any anatomic obstruction of these passages. In spite of the absence of an obstructive element, the livers in these cases, as you saw, showed an inflammatory infiltration of the portal spaces.

In answer to Dr. Mann's remarks with reference to scarring of the liver capsule, I want to point out the fact that these scars appeared as frequently on livers in the region of normal gallbladders as in those showing cholecystitis. All clinical authorities are in agreement with Dr. Mann's statement that cholecystitis in younger individuals frequently follows such infectious diseases as scarlet fever, rheumatic fever, streptococcic sore throat, and middle ear disease.

I agree with Dr. Johnson, that in all probability absorption of bacteria and toxins through the portal blood stream is responsible for the constant finding of inflammatory cells in the liver. As Dr. Johnson intimated, cholecystitis is seen in a high percentage of cases of cirrhosis of the liver.

DR. E. M. HAMMES (St. Paul) reported a case of cavernous hemangioma of the sixth and seventh dorsal vertebræ with compression syndrone of the spinal cord, and marked spastic paralysis of eight months' duration, with two laminectomies at six-month intervals, and with complete recovery except for a positive Babinski. An article on Cavernous Hemangioma with complete case report will be published later.

DR. A. A. ZIEROLD (Minneapolis) reported a case of "Cyst Within the Common Duct."

DISCUSSION

DR. R. E. SCAMMON (Minneapolis): There have been occasional reports or descriptions of small diverticula of the common bile duct. That is quite common in the lower animals. However, as I understand it, this cyst lay within the lumen itself, and that seems to me very peculiar. It does not seem very likely that it is embryologic in its etiology. Certainly these cysts are quite unusual in the human embryo. Occasionally we see little outgrowths, but even these are very unusual.

The meeting adjourned.

R. T. LA VAKE, M.D.
Secretary.

PROGRESS SECTION

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

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MEDICINE

TUBERCULOSIS ABSTRACTS*

Health examinations of students in high schools, colleges and universities are being applied more widely every year. Latent defects are thus brought to light and early treatment results in correction or cure of the incipient disease. Agencies for the control of tuberculosis have been among the leaders who stressed the importance of health examinations, and the value of the application of the tuberculin test and X-ray examination in the discovery of latent tuberculosis has been repeatedly demonstrated. The results of a recent investigation at the Henry Phipps Institute in Philadelphia into the incidence of tuberculous infection and tuberculous

*Reprinted from *Tuberculosis Abstracts*, a review for physicians issued monthly by the National Tuberculosis Association, July, 1932, Vol. V, Number 7.

disease in medical and college students are presented below. Although the high incidence of tuberculosis in medical students may present a special problem the value of health examinations, here illustrated, has universal application.

Tuberculosis In Medical And College Students

Since medical students either during their medical course or in subsequent years often become ill with tuberculosis, a study was undertaken to determine the frequency and severity of tuberculous infection among medical and premedical students of the University of Pennsylvania. The usual methods of investigation into the incidence of tuberculous infection and disease were employed.

After the weight and height had been recorded, inquiry made concerning respiratory disease with which they had suffered and possible exposure to tuberculosis noted, students were given intracutaneous tuberculin tests, stereoscopic roentgenological examination of the chest and, when the latter revealed tuberculous infiltration of the lung, physical examination.

Results of the tuberculin tests of 236 premedical and 439 medical students are shown in Table I. There was no continuous increase in successive classes of the number of premedical students who reacted to tuberculin, variations being doubtless dependent upon the small number in each class. The percentage of premedical students that reacted to tuberculin was 85.6 per cent. The number of medical students of the first year who reacted was approximately the same, namely, 84.8 per cent. In the second and third year classes the number who reacted was higher, and in the fourth year it reached 98.2 per cent. The continuous increase in the frequency of infection during the medical course corresponds with the increasing number of tuberculous infiltrations found by roentgenological examination.

TUBERCULOUS LESIONS FOUND

Table II shows the result of roentgenological examination of 731 medical and premedical students arranged in classes. Calcified nodules in lungs or lymph nodes represent tuberculous infection, usually acquired in childhood. Their opacity and sharp definition distinguishes them from the diffuse lesions that are listed in the table as latent apical tuberculosis and manifest tuberculosis. They are doubtless in process of healing but their presence does not exclude the occurrence of progressive tuberculosis.

Calcified nodules of the lungs or the adjacent lymph nodes without other demonstrable tuberculous lesion were found in 44 of 279 college students or 15.8 per cent and in 79 of 452 medical students or 17.5 per cent. In ten of 45 instances of latent apical tuberculosis in medical students and in three of fourteen instances of manifest pulmonary tuberculosis in the same group, there was associated tuberculosis of the tracheobronchial lymph nodes.

With the lesions designated as latent apical tuberculosis there have been no symptoms of tuberculosis, and physical examination has revealed no physical signs. The number of these lesions has been practically the same in students of the four premedical classes and of the first year class in medicine. They increase in number considerably in the second year and slightly in the two subsequent years.

Students with manifest pulmonary tuberculosis have had symptoms such as coughs, hemoptysis, fever or loss of weight. Significant physical signs were râles, impaired resonance and restricted movement over the site of the lesion. Only one premdical student with manifest pulmonary tuberculosis was found.

One instance of clinically manifest tuberculosis was found in the first year medical class and none in the second year. In the third year class, however, there were four instances of pulmonary tuberculosis accompanied by symptoms or physical signs and in the fourth year class there were nine.

APICAL LESIONS

In Table III lesions found at the apex of the lung are classified in accordance with their extent. Shadows of doubtful significance, designated as suspected apical infiltration, were found in a considerable number of medical students, though it is uncertain whether these are due to tuberculous infiltration. It has been considered desirable to reexamine students with these anomalous shadows at repeated intervals.

In about 3 per cent of college students there was infiltration limited to the area above the clavicle, whereas 8.6 per cent of medical students had similar lesions, their number increasing from 3 per cent in the first year to 10 per cent in the fourth year. In some instances opaque salients project below the border of the second rib, and in all others there were some scattered shadows throughout the area above the clavicle.

Conspicuous pulmonary infiltration extending below the clavicle was not found in students of the first two years, but occurred in 6 medical students of the third year and in 13 of the fourth year.

The number of young adults with apical lesions of tuberculosis increases gradually with increasing age, but the incidence of these lesions in medical students, increasing rapidly in successive years of the medical course, with astonishingly high incidence in students of the fourth year, indicates that they are peculiarly subject to grave tuberculous infection.

FURTHER STUDY INDICATED

The results of this investigation, confirming, as they do, previous observations made at various medical schools concerning the development of clinical tuberculosis in medical students and internes, present a problem that requires further study. While the treatment of the individual patient differs but slightly from any other individual with a similar tuberculous lesion the cause of the high incidence of tuberculous disease in this group must be sought for and prevented.

"Tuberculosis in Medical and College Students"—H. W. Hetherington—F. Maurice McPhedran—H. R. M. Landis—Eugene L. Opie—Archives of Internal Medicine, Nov. 1931.

CHOREA GRAVIDARUM—A STATISTICAL STUDY OF 951 COLLECTED CASES: Prentiss Willson, M.D., and Alec A. Preece, M.D., Washington, D. C. (Arch. Int. Med., Vol. 49, No. 3, pp. 471-533, and No. 4, pp. 671-697, March and April, 1932). This is a complete and comprehensive review of 951 choreic pregnancies occurring in 797 patients. The frequency in U. S. Hospital cases is about one in 3,500, which would classify it as a rare disease. The majority of cases occurred in primipara and the average age was 22.4 years. A previous history of chorea was obtained in 60.9 per cent while 39.7 were associated with or gave a history of rheumatism. Definite clinical heart disease was noted in one-third of the cases, whereas autopsy revealed cardiac pathology in 87 per cent. There is a tendency to recurrence as shown by the occurrence of 253 choreic pregnancies in 99 patients. In 48.6 per cent the pregnancy was uninterrupted and terminated by spontaneous labor at term. The symptoms, complications and histopathologic findings are identical with those found in Sydenham's chorea. The mortality rate in patients having had previous attacks of chorea is considerably lower than the average mortality for all cases and is explained as possibly due to some developed immunity. The mortality in 749 patients was 18.1 per cent. The fetal mortality was 50.9 per cent.

Two important conclusions are drawn: First, that the chorea occurring during pregnancy is identically the same disease as Sydenham's chorea in adolescents, modified slightly, in certain respects, by its association with pregnancy. Second, that intervention or interruption of pregnancy is indicated in the case which is getting progressively worse, despite treatment, and should be done before fever, leukocytosis, etc., give evidence of active and generalized infection.

RUSSELL J. MOE, M.D.

FOOD ALLERGY IN THE DIFFERENTIAL DIAGNOSIS OF ABDOMINAL SYMPTOMS: Albert H. Rowe (Amer. Jour. Med. Sci., April, 1932). Food allergy is not infrequently the cause of acute abdominal pain and vomiting and many other persistent gastro-intestinal symptoms. Surgeons as well as internists, therefore, must keep food allergy in mind in the differential diagnosis of all abdominal symptoms.

In an analysis of fifty of the records of a group of a hundred patients with such disorders the occurrence of the following symptoms was revealed:

	Per cent
Canker sores	20
Coated tongue	18
Heavy breath	14
Distention	32
Belching	20
Sour stomach	18
Epigastric heaviness	28
Burning or pyrosis	14
Nausea	40
Vomiting	30
Intestinal cramping	24
Mucous colitis	14
Diarrhea	12
Constipation	32
Proctitis	2
Pruritus ani	4
Pain and soreness in the epigastrium	20
In upper right quadrant	14
In mid-abdomen	10
In lower abdomen	20

The symptoms including weakness, fatigue, irritability, nervousness, mental dullness and confusion and generalized aching due to "allergic toxemia" from foods were present in a number of these patients. A family history of allergy was present in 65 per cent of the patients and a personal history of asthma, hayfever, cutaneous allergy or migraine was present in from 13 to 36 per cent.

It is well to remember that allergy produces two main reactions in tissues which give rise to its symptoms: (1) Edema of the mucous membranes and other tissues with the concomitant production of mucus and disturbed membrane permeability and, (2) Smooth muscle spasm which may occur in any tissue containing such smooth muscle from the bronchi or arteries to the gastro-intestinal or urogenital tract. Angioneurotic edema has been observed at operation for supposed obstruction. The mucous membranes and the abundant smooth muscle of the digestive tract, therefore, are natural sites for the establishment of allergic reactions from foods. It is probable that lesions similar to urticaria, erythema and even eczema in the skin may occur in the various parts of the gastro-intestinal tract.

Food seems to be the outstanding cause of allergic digestive symptoms although it is quite likely that allergic reaction to bacteria and other allergens than food may produce symptoms in various parts of the gastro-intestinal tract.

The symptoms have been classified under those related to the stomach which may be mild or severe and may occur immediately or be delayed one to three hours. Gastro-intestinal symptoms so frequently are associated with migraine and have been relieved through the elimination diet of Rowe, it is his opinion as well as that of Balyeat that most cases of migraine are due to food allergy.

The intestinal symptoms such as vomiting and anorexia as well as nausea may be due to food allergy which may arise from a disturbed peristalsis in the small intestine or in the stomach. Roentgen-ray studies of certain patients with gastro-intestinal allergy have revealed moderate duodenal stasis and reversal of peristalsis as well as hyperperistalsis and hypermotility.

The spasm and mucus of mucous colitis can be well explained by food allergy. It is quite probable that the so-called irritable bowel for which no satisfactory etiology has ever been presented often may be due to food allergy.

Abdominal pain and soreness may also be caused by food allergy. Allergic reactions in the cecum probably extend into the appendix and no doubt many appendectomies have been done because of allergic reactions in the colon and appendix.

Acute allergic reaction may be accompanied by fever, a leukocytosis of 12,000 to 20,000 although the polymorphonuclears are usually below 80 per cent. The symptoms that should suggest to the physician the possibility of allergy are:

A personal history of hayfever, urticaria, eczema, migraine or recurrent colds or cough and, in certain instances, of chronic gastro-intestinal symptoms. In such instances of chronic gastro-intestinal distress the family history likewise is important.

The history of definite food disagreement and dislikes should also suggest the possibility of allergy. Skin testing with foods should be done, although it is Rowe's experience that skin reactions are rarely of much help in the study of patients with gastro-intestinal allergy. Determination of food allergy therefore must be made with diet trial, such as his elimination diet.

R. BARDON, M.D.

PEDIATRICS

ATELECTASIS IN THE NEW-BORN: Ethel C. Dunham, M.D., New Haven, Conn. (Amer. Jour. of Dis. Children, March, 1932, Vol. 43, No. 3). Atelectasis in the new-born is the abnormal persistence of the condition of incomplete expansion of the lungs which is physiologic in the first few days of life.

The chief symptom of atelectasis is cyanosis, which may be constant or intermittent. The diagnosis of atelectasis can be made most satisfactory by use of the roentgenogram.

Atelectasis of the lungs in new-born infants is the abnormal persistence of the fetal state of the lungs due to some condition that interferes with the normal functioning of the respiratory center or to mechanical obstruction of the air passages.

Cyanosis due to atelectasis of the lungs can be differentiated from cyanosis caused by other conditions by means of roentgenograms.

The roentgenographic picture of atelectasis of the lungs in the new-born is characterized by haziness of the lung fields, which is evidence of lack of complete aeration, and by the abnormal shape of the thorax and the abnormal position of the ribs, which are evidence of incomplete expansion of the lungs.

Roentgenographic examination of the lungs is always indicated when a new-born infant is cyanotic.

R. N. ANDREWS, M.D.

LEMON JUICE EVAPORATED MILK IN INFANT FEEDING: Oscar Reiss, M.D., Los Angeles (Arch. Ped., Vol. XLIX, No. 3, March, 1932). The author's experience leads him to believe that lemon juice evaporated milk formulæ offer a type of infant food well suited for routine use in feeding of the normal baby during the entire first year of life. They compare favorably with fresh milk formulæ as to safety, digestibility, and nutritional value.

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Lemon juice	5 teaspoons

pH—5.61
Calories—21 per ounce

R. N. ANDREWS, M.D.

THE SURGERY OF THE UNDESCENDED TESTES: O. H. Wangensteen (Surg., Gyn. and Obst., 54:219, Feb., 1932). Author's summary: "The imperfectly descended testis is aspermatic because of its position. Prior to puberty the undescended testis is in every respect much like its normal fellow in the scrotum. The scrotum serves as a thermo-regulating mechanism, and in the adult only a scrotal testis is normal. The undescended testis is more likely to become malignant than is the normally descended one, and scrotal fixation does not diminish this increased predisposition to malignancy. The undescended testis, however, is not a precancerous lesion, and it is true that testicular malignancies are infrequent.

The procedure of election in the treatment of failure of descent is placement of the testes into the scrotum without injury to the testicular blood vessels. Adequate mobilization of the vessels of the testes (spermatolysis) is a significant and essential factor for the success of the procedure. In the operation of orchiopexy, temporary scrotal anchorage is an important detail of the technic. Without adequate scrotal fixation, retraction occurs, and growth of the testes commensurate with the normal does not obtain. A method to secure this end is described. The opportune time for the performance of the operation is between eight and eleven years; to insure a good functional result it is important that the operation be done before puberty."

C. A. STEWART, M.D.

LIPODYSTROPHIA PROGRESSIVA: Aaron Capper, M. D., Philadelphia (Arch. Ped., Vol. XLIX, No. 3, March, 1932). Lipodystrophia progressiva is a disease characterized by a symmetrical and progressive loss of the subcutaneous fat from the face, neck, arms, thorax and abdomen, with a relative abundance of subcutaneous fat over the hips, buttocks, and lower extremities.

The first case of this condition was briefly described in the eighteenth century by Morgagni, which was later mentioned by Zalla and Gugliemo. Sir William Osler observed a case in 1895, but published no record of it. The first complete and scientific description of this condition was by Barraquer from Barcelona, Spain, in 1906. The majority of the cases reported, over 50 per cent, originated in Spain. The muscular strength of the patient having lipodystrophia progressiva is unaffected.

On account of the normal blood cholesterol and the normal fat excretion in the stool, they feel that the difficulty does not lie so much in an inability to assimilate fat as in depositing it. It seems reasonable to suppose, therefore, that there might exist in the tissues of the upper half of the body a sort of negative chemotaxis for fat globules or an inability of the cells to take on fat as they normally did before this condition developed. There might exist a disease of fat tissue itself which interferes with the normal deposition and incorporation of the fat globules in the subcutaneous areolar tissues of the upper half of the body. Most of the reported cases occurred in females.

R. N. ANDREWS, M.D.

STUDIES ON INFLUENZAL MENINGITIS—THE PROBLEMS OF SPECIFIC THERAPY: H. K. Ward and J. Wright (Jour. Exp. Med., 55:223, Feb., 1932). The authors point out that influenzal meningitis is a disease of infancy and childhood and is usually fatal. Rivers found a mortality of 92 per cent in 220 cases reported in children under two years of age. Ward and Wright point out complement which is present in the cerebrospinal fluid in epidemic meningitis is absent in cases of influenzal meningitis. Bactericidal experiments suggest that the injection of a specific antiserum will have but slight lethal effect on the organisms unless complement is injected at the same time. Treatment with a mixture of specific antiserum and complement led to definite clinical improvement in some of their cases, coincident with sterilization and cleaning of the cerebrospinal fluid. After some days, however, the patients relapsed and died. Autopsy showed localized abscesses in the vicinity of the base of the brain, the lesions being definitely walled off from the general subarachnoid space. In one case the patient recovered.

Since the walls of the abscesses apparently present an insuperable mechanical obstacle to the action of the antiserum and complement, the need of early diagnosis in such cases whereby serum and complement may be employed for rapid sterilization of the cerebrospinal fluid before abscess formation occurs is suggested.

C. A. STEWART, M.D.

EFFECT OF DIGITALIS BODIES ON THE VOMITING REFLEX

A moderately toxic dose of digitalis bodies induces attacks of vomiting, which continue and become more intense as the dose is increased. The vomiting may stop for several hours and then recur after the drug has been discontinued. However, the vomiting may cease as the drug is continued and other toxic effects appear in the form of premature contractions of the heart or bigeminal rhythm. An experimental study undertaken to determine if it was possible for digitalis bodies to abolish this emetic action of the drugs, while at the same time increasing the extent of the cardiac poisoning, indicates that physicians should be cautious in relying on nausea and vomiting as a measure of the degree of cardiac poisoning. The continued use of large doses of digitalis bodies may depress the vomiting reflex and at the same time increase the intensity of the cardiac poisoning. (Jour. A. M. A., March 12, 1932, p. 893.)

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

AN EXPERIMENTAL AND CLINICAL STUDY OF PAIN IN THE PLEURA, PERICARDIUM AND PERITONEUM. Joseph A. Capps, M.D., Professor of Clinical Medicine, University of Chicago. 99 pages, Illus. Price, $3.00, cloth. New York: The MacMillan Company, 1932.

PRIMER ON FRACTURES. Illustrated. $1.00. A. M. A., Chicago, 1931.

Only the highest praise can be given in any review of the "Primer on Fractures" as its value as a guide in fracture treatment is inestimable. One feels that if a few pertinent facts regarding a fracture in any given locality are driven home, a medical meeting or scientific gathering is certainly worth while. The "Primer" drives these facts in by virtue of the clear-cut mottos or placards, and illustrations. Certainly every practicing physician should have this brief but valuable book.

G. A. WILLIAMSON, M.D.

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